THE #1 MAGAZINE FOR HOME WOODWORKERS

OCTOBER 1991 • ISSUE NO. 46
Display until October 15

10 SHOP-SMART WAYS TO WORK WITH PLYWOOD

CARVE AN OTTER WITH DESIREE HAJNY

WOOD LOOKS AT 29 DADO CUTTERS

MORE FUN PROJECTS!
Ash toboggan
Noah’s ark
Toy floatplane
Lotion dispenser
Noodle cutter
Key chains
Turned mallet
Family-feud cutout

ALL-STAR ENTERTAINMENT CENTER
See Page 50
We figured it was time you moved up to stationary tools that are a cut above the rest. Time for Delta quality. The pros' choice. Your choice, $349 bucks.

For starters, we're giving you two table saws and a band saw. But to rip a perfect edge, you need to start with a perfect edge. So we added a jointer. For $349.

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*Offer good only from participating dealers in the continental U.S., Alaska and Hawaii, from September 1, 1991 thru March 31, 1992.
A couple of years ago, my wife Trudy looked at our aging television console and asked, "Is there any way you could slip a new TV into the opening where the old set is?" My response: "Impossible." I was planning, my annual Canadian fishing trip, and the last thing I wanted was another project.

But that was then, and this is now. As you can see in the photo above, I'm "almost through" proving to my wife once again that I can do the impossible.

Why the sudden change of heart? It all started one morning when I poked my head into the WOOD® magazine shop. There stood Jim Boelling, building the entertainment center that we feature on page 50. From the moment I saw it, I couldn't help but think we were re-engineering a concept that enjoyed enormous popularity in the '60s and early '70s—console entertainment centers.

I'm sure you remember them—impressive wood cabinets that housed vacuum-tube television sets. You still can find these wonderful cabinets today, quite possibly in your own living room or family room, though more often than not the TV has long since gone on the fritz. And because the cabinet looks too good to toss, you set your 19" color television, and maybe a VCR, on top of it.

Anyway, that's why I'm giving our console a new lease on life. As it turns out, gutting the old unit proved easy. It took less than 30 minutes to remove the picture tube, trim pieces, and the other nameless parts you see here. And it doesn't look like it's going to take much longer than that to tailor the opening to the new TV set.

So if you're one of the thousands who kept an entertainment console around the house, you may want to try this idea yourself. In an upcoming issue, I'll share more of the particulars on retrofitting these aging beauties. ☞

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Better Homes and Gardens

WOOD

THE #1 MAGAZINE FOR HOME WOODWORKERS

This issue’s cover wood grain: bird’s-eye maple  
Cover photo: Hopkins Associates

OCTOBER 1991  
ISSUE NO. 46

WOOD PROFILE

Teak: The tropics’ top seafaring stock 33
Serving both indoor and outdoor uses, this tough, attractive wood takes five years to arrive at market from its Southeast Asian rain forest origins.

CRAFTSMAN CLOSE-UP

Hedge rustic 35
When Kansas craftsman Bud Hanzlick travels through farm country and spies a row of Osage orange trees, he sees a porch full of rustic Adirondack-style furniture.

CARVING

Here’s Otto 40
Once again, renowned carver Desiree Hajny has provided us with an exclusive wildlife carving. If you liked Roscoe the Raccoon, you’ll love Otto.

SHOP-TESTED TECHNIQUES

10 winning ways to work with plywood 44
When cutting, routing, and edging, seasoned woodworkers know that plywood needs special care. Get great results with these handy tricks.

All-star media center 50
Stereo components, a 27” TV (or smaller), a videocassette recorder, tapes, and discs all fit comfortably in this handsome, multifunctional walnut cabinet.
Oh my, what a contest 56
With our 1991 Build-A-Toy contest over, it's time to see the winners from among 439 made-with-love toy entries.

Sea skipper 58
Scrollsawers, you'll enjoy cutting out, painting, and assembling this wonderfully simple and colorful floatplane. It's from our Build-A-Toy contest.

TOOL BUYMANSHIP
Dado-cutting tools 60
Don't spend a dime on a cutter for rabbets, grooves, and dadoes until you see what our tests revealed. The tool options and quality differences will surprise you.

Bentwood toboggan 66
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Slow-set epoxy 71
Learn how to work with this mighty weather-resistant glue.

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Make the perfect container for hand lotions and soaps.

Noah's lovable ark 76
Take a few evenings or a weekend to make this charming biblical boat.

Letter-perfect key chain 79
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Resaw Jig 80
Now, cut thin stock safely and efficiently with this handy helper.

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WOOD MAGAZINE OCTOBER 1991
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PERSUADER

A TURNED MALLET FOR YOUR SHOP

Here in the land of plenty, when we need a tool, a quick jaunt to the hardware store satisfies our desires pronto. But in Brazil, native Haroldo Martins of Campinas claims that quality tools are not so readily available. He gets around the problem by making many of his own tools, including this trusty mallet, turned from muirapiranga—an Amazon River Valley hardwood. Haroldo turns and burnishes numerous little coves in the handle to ensure a good grip. If you’re inclined to “knock” around the shop, then do it with a mallet like Haroldo’s.

Full-sized Pattern
Overall length of handle = 13"

Start with mallet head
1 To shape the mallet head, mount a 2½"-square piece of stock between centers, and turn it round using a 1/2" gouge. (See the full-sized Mallet Head drawing for reference.)
2 Using calipers and the dimensions shown above, taper the ends of the mallet head, and form a very slight convex surface on each end. This helps prevent the head from denting the furniture components during assembly.
3 Remove the head from the lathe, and drill a ¾" hole 1¾" deep and centered between the ends to accommodate the handle tenon later. (We secured the head with a handscrew clamp during the drilling operation.)

Coming to grips with the handle
1 Mount a piece of 1½"-square stock 14" long between centers, and turn the handle blank round. Taper the handle, form the tenon, and then shape coves where shown on the drawing at right.
2 Form the handle grip by marking the groove locations, and making shallow cuts with the tip of a parting tool or skew. Next, with the lathe running at about 3,000 rpm, hand-hold a portion of a 12"-long piece of wire against—but not wrapped around—each V-cut until the wire gets hot enough to singe the wood.
3 Finish the mallet as desired. (Haroldo relies on an American favorite, polyurethane.)

Project Design: Haroldo Martins, Campinas, Brazil
Photograph: Hopkins Associates
Illustrations: Kim Downing, Mike Henry
TALKING BACK

We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, Better Homes and Gardens® WOOD® magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

Williamsburg tool exhibit delayed

Thanks for including information about Colonial Williamsburg’s upcoming tool exhibit in your January 1991 issue. A correction does need to be made concerning the exhibition’s date, however. We currently expect it to open sometime in 1993, rather than “early next year” as stated in the article. I’d hate to have your readers, many of whom have called about exhibit dates, be disappointed by arriving too early.

—Jay Gaynor, curator of mechanical arts,

Alternative source found for clock/calendar modules

In the August 1991 issue, we showed you how to build a clock/calendar module. Although we double-checked before publication, Classic Gifts International, the company that agreed to sell the modules to our readers, has since gone out of business. We have located another source that has agreed to supply the electronic modules to you at the original price. You can order one for $19.95 ppd. from New Products, 15 West Street, Spring Valley, NY 10977. Identify it as the clock/calendar for the WOOD magazine project. Sorry, no telephone orders.

Standard nickel clipboard clips available

HELP! I recently started to make my wife an exotic wood clipboard. Seemed easy enough until I got to the clip. I’d like to use a nice one, perhaps gold-plated, but I can’t even find a source for common clips. I could buy a clipboard and swipe the clip, but already she’s making noises about how her friends will want one, and it looks like I’d better plan on 10 or so. Any ideas?

—Bob Montgomery, Fort Orange, Fla.

Bob, Meisel Hardware Specialties, in the 1990-91 catalog, offers brass clips in 43/8” and 23/4” sizes, nickel clips in 6” and 3” sizes, and a 3” nickel folding-armor clip. Each costs less than $1. Meisel’s has a $15 minimum order and a $4.95 delivery charge. For a catalog or to order, call 800/441-9870.
Dowell on shrinking dowels
I'd like to throw out another suggestion for coping with "The Incredible Shrinking Dowel" (June 1991). I buy the dowel first, and then bore my stock accordingly. That way I don't have to drive around town looking for a dowel to fit the hole.

I'm a furnituremaker by profession and woodworking is my hobby. Everyone, beginner to pro, can benefit from your fine magazine.

—Ed Dowell, Tacoma, Wash.

Radial-arm saw books located
Could you tell me where I may get Fine Tuning Your Radial-Arm Saw, by Jon Eakes? I’ve looked in bookstores. They don’t have it and tell me it can’t be ordered.

—Albert Barnes, Cramerton, N.C.

Albert, we have gotten a couple of dozen letters and telephone calls from readers unable to find Fine Tuning Your Radial-Arm Saw. Another reader recommended the book in this column in the August 1991 issue.

While the book is out of print, the publisher, Sterling Publishing Co., Inc., helped us track down 3,000 copies in Ottawa. The book, catalog no. 491.0701, is $30 ppd. in the U.S. and $25.50 ppd. in Canada. Check and credit card orders will be filled at Lee Valley Tools, P.O. Box 6295, Station J, Ottawa, ON K2A 1T4. Or order by calling 613/596-0350. In Western Canada, call 800/267-8757. In Eastern Canada, call 800/267-8767. Sorry, COD orders will not be filled.

Forester speaks out
As a professional forester, and amateur woodworker, I must reply to Mr. Robert Gilly’s concern about the depletion of forests (August 1991). I have practiced 40 years as a private industry forester in Iowa, the Pacific Northwest, the Southeast, and Kenya.

Harvested forests are not lost; they are utilized for the benefit of society. Forests are lost when the land is converted to other uses, such as agriculture, shopping malls, homesites, and highways. The real loss of natural resources, including forests, is caused by the human animal, whose reproductive habits outstrip his environment.

The U.S. has three-quarters of its original forest acreage and latest Forest Service surveys indicate that this country grows more wood than is currently being harvested. These forests provide hunting, fishing, recreation, and homes for wildlife. They also promote soil and water conservation.

—Gordon White, Huntsville, Ala.

Continued on page 10
**STEVE WALL LUMBER CO.**

Quality Hardwoods and Woodworking Machinery For
The Craftsmen and Educational Institutions

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<td>Cedar (Aromatic)</td>
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<tr>
<td>White Pine</td>
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<tr>
<td>Yellow Pine</td>
<td>4/4</td>
<td>Clear 1.20</td>
</tr>
</tbody>
</table>

Above prices are for 100' quantities of kilndried rough lumber sold by the Bd. Ft. FOB Mayodan, NC. Call for quantity discounts. Other sizes and grades available.

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**TALKING BACK**

Continued from page 9

**Who's reforesting clearcuts?**

Thanks for the Rain Forest Update featured in the June 1991 issue. It sounds like the Woodworkers Alliance for Rainforest Protection is on a good track. But shouldn't conservationists be just as concerned with the fate of lands already logged as they are with protecting the remaining forests? Millions of already-denuded acres need to be reforested, hopefully with a variety of native species and not in the wildlife-desert monocultures favored by those interested only in maximising gross timber output. We have plenty to do here at home in our own "rain forests" too. There are more than a million acres needing planting in Washington state alone. Let's make smoke about this until the government responds.

—Jim Wallin, Forest Grove, Ore.

**Indian carvings get mixed review**

I was pleasantly surprised to learn in the April 1991 issue of WOOD magazine of Peter Wolf Toth and his tribute to our native Americans through his "Whispering Giants" sculptures. [Toth has sculpted 60 Indians across the country.] A man of such vision and singular conviction is worthy of all the acclaim he may receive.

I was disappointed, however, by the following article, which included instructions on how I, a white, middle-class male, can carve my very own "Indian" in an image "so recognizable and sought after" as a cigar store token! You have exhibited very poor taste and judgment. This "Cigar-Store Indian" may be an image worth 1,000 words, but for me they begin with "shameful, degrading, tasteless, pitiable..."

—John Saunders, Sarasota, Fla.

**Belt-cleaning shop tip could lead to silicone contamination**

In response to a reader tip in the August 1991 issue of WOOD, I strongly disagree with using cured silicone caulk to clean abrasive belts, drums, and disks. Being a maker of custom furniture, one of the biggest problems I run into is silicone contamination caused by lubricants and hand creams. Nothing's more frustrating than working weeks on a piece only to find white spots (fish-eye) when the finish is applied. I'm not sure what the commercial belt cleaners are made of, but I would suggest trying cured latex caulk with no silicone added.

—R. Billing, Chicago, Ill.

Continued on page 12

10

WOOD MAGAZINE OCTOBER 1991
Tips from Freud

Tip 1. LU85M - How to get silky smooth cross grain cuts without sanding.
From the cutting angles, to the Teflon coating, everything in this blade was designed to obtain the
ultimate finish. Not only is sanding not required, but in most cases it will even ruin the cut. Ideal
for accurate cutting of precious woods, precision miter, or picture framing where sanding could
result in rounded edges and gaps in the joint. Will fit in miter saws, chop saws, radial arm saws
and table saws.

Tip 2. LU84M - How to save yourself hours in shop time.
In many woodworking shops one saw may be needed to rip a piece of 4/4 oak one minute or a
sheet of thin plywood the next. The Freud LU84 combination design gives you the flexibility of
working with different materials without worrying about changing blades. This is because the teeth
are grouped in sets of 5 and are separated by a deep gullet. This combines the high number of
teeth required for crosscutting with the chip ejection ability of a rip saw. To maximize the safety of
this blade, the deep gullet has an Anti-kickback design. Excellent on radial arm saws because the
climbing effect is eliminated.

Tip 3. LU87M/LU88M - How to increase the performance of your table saw or radial arm saw.
By using Freud’s thin kerf blades, LU88M for crosscutting and LU87M for ripping, your saw will be removing less
wood than the standard carbide blade, requiring less horsepower to produce equally good results. Thin kerf blades
reduce the radial arm saws aggressive self-feeding characteristics. In the past, thin kerf blades have been inferior,
but Freud engineered a blade that helps to control the speed that is 28% thinner than a standard blade and is laser cut and
prenotched to eliminate these problems. The blade has a Teflon coating to prevent heat build-up due to friction.
All this provides a blade that is easier to feed and requires less power with equal precision.

Tip 4. LU91M - How to get the most from your compound miter saw.
The LU91M produces a superior finish cut on sliding and non-sliding compound miter saws. The 5° negative
hook prevents the blade from being too aggressive and will push the work piece down and towards the fence.
This negative hook angle meets the original equipment manufacturers recommendations for all of the sliding
compound miter saw. This blade uses Freud’s Thin Kerf Technology to reduce the power required and the
material removed. This also helps to reduce the climbing effect associated with saws of this type and radial
arm saws. Combine this with Freud’s advanced carbide, laser cut body, and CAD technology and you have a
blade that will out perfom all others. Use on the Hitachi CBFB, DeWalt 1707 Crosscutter, and Makita LS1011.

Tip 5. LU92M - How to cut Corian® counter tops with confidence.
About the only way you can ruin a Corian® or laminated counter top with Freud's LU92M is to
measure wrong. It was engineered specifically to cut the broad array of counter top materials
available today. The LU92M will zip through Corian®, melamine, and laminates with little effort and
leaves a smooth, chipless cut. These blades are equipped with Freud's exclusive HOOK carbide
teeth tested by a leading university against other leading carbide blades. The results from the HOOK
carbide left all others in the dust. Each tooth has a special Modified Triple Chip Grind that was
designed by computer simulation to breeze through solid surface materials or single and double face
laminates with a virtual chip free edge.

Compare These Freud Advantages:
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- Impact resistant Tri-metal Brazing
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- Exclusive Anti-kickback Shoulder Design
- Special Factory Tensioning

freud
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A remote dust-collector switch for woodworkers on the go

Your remote dust-collector switch is somewhat cumbersome compared to the electronic device I am using. It consists of wireless burglar alarm components commonly available through electronics catalogs, stores, and departments. Each of the two units is about the size of a pack of cigarettes. The dust collector plugs into one unit, which in turn is plugged into a standard A/C electrical outlet. Now all you need is the handheld remote on/off switch. You won’t need any wiring.

I fasten my remote to my left arm with a thick rubber band, but you can wear it on your belt or keep it in your pocket. The device is sold by Radio Shack as product No. 61-2667, and carries a price of $21.95. It also sold by Heath Co., Benton Harbor, Michigan, and in some local home centers.

The only disadvantage is that this model’s electrical capacity is limited to 110 volts and 15 amps. Larger, heavy-duty units cost more and work on the same principle. I have already saved the price of the system in shoe leather alone.

—Karl Schultz, Berwyn, Ill.

Reader cleans up dust with a 3-vac attack

I thoroughly enjoyed the central dust-collector article. Kudos to Bill Krier and his colleagues for the interesting information, pictures and illustrations. You stimulated my thinking.

After sketching several plans and checking prices, I explored another alternative. I already had one large shop vacuum. By adding two more (which were on sale), I can now collect dust from my tablesaw, radial-arm saw, belt/disc sander, and bandsaw very effectively.

—Ed Heuer, Port Edwards, Wis.

Scoring test tubes by the score

If you need test tubes for bud vases or other uses, a Des Moines outfit can supply them in boxes of 20 for $9.95 ppp. The following test tubes are available.

<table>
<thead>
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<th>Catalog number</th>
<th>Metric size</th>
<th>Approx. size in inches</th>
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<tbody>
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<tr>
<td>SR166B</td>
<td>16 × 150mm</td>
<td>¾ × 5 1/2&quot;</td>
</tr>
</tbody>
</table>

Send check or money order to SHARAY, P.O. Box 3093, Des Moines, IA 50316.
Readers respond with scrollsaw-pattern sources

In the April 1991 issue, we asked for help locating new scrollsaw pattern sources for reader Boyd Pearson. Your suggestions ranged from tracing old catalog pictures to the using of stained-glass window pattern books.

One of you offered to draw him patterns. Several others recommended paper-cutting books from Back Street Designs and Dover Publications. Here are some excerpts from letters:

Scherenschnitte (paper cutting) pattern books, available in crafts stores, are an excellent source. Many of these books are published by Back Street Designs, Inc. P.O. Box 1213, Athens, AL 35611.


George S. Bulau, Spring Hill, Fla.

Shine a light on an object and trace its shadow.
—Mark Conley, Lexington, Ky.

Boyd will find more patterns than he can shake a stick at in fabric-store sewing pattern books.


Other readers suggested the following:

- Papercuttings by Alison, 404 Partridge Circle, Sarasota, FL 34236 ($1.50 for a catalog).
- Leather carving designs from Tandy Leather.
- Klockit patterns, call 800-556-2548 for catalog.
- Complete Book of Stencils, by Joanne C. Day. Patterns for stained glass, leather work, and etching; magazines and newspapers; line drawings, stencils, and silhouettes; weather vane patterns in ironworks books; and, coloring, tote painting, and calligraphy books.

Continued on page 14
Talking Back

Continued from page 13

Cutting kickback on bandsaw illustrations

In the shop tips section, page 12, August 1991 you show an illustration of hands cutting dowels to short length freehand on the bandsaw. It is unfortunate that this illustration slipped past your safety expert. The professionals will know better. I worry about the novices who read the shop tip and follow the illustration exactly as shown. The safety rule is “Never cut round stock on any power saw without using a V-block and clamping devices.”

—Wally Fillingham, Kalamazoo, Mich.

May you sell these projects?

Readers often write to ask if they can build and sell the projects presented in WOOD magazine. You may build and sell any item designed by a member of our staff (see the masthead on page 5 for a list and compare those names to the design credit accompanying each project). But, if we bought the project from an outside designer, it is neither ethical nor legal to manufacture or sell their copyrighted item. You may make those projects as gifts for friends and family, but not for sale.

Dust-collector static

Your article on building a central dust-collection system in the June 1991 issue was especially interesting to me because I recently constructed and installed a similar system in my shop. One difference is that in running my internal ground wires, at the end of each pipe section, I drilled a ½” hole, threaded the wires through, and connected them on the outside. Changing the system is easier this way, and trouble spots, where the ground wire can trap chips, are eliminated. The few ungrounded inches shouldn’t allow a static charge to build.

—Roger Hearn, Detmar, Del.

Get your braided ground wire here

Several readers have written to ask where to get the braided ground wire we used in our June 1991 central dust-collection system article. If you’re having trouble locating the wire, contact Radio Trade Supply, 1017 High St., Des Moines, IA 50309. Refer to our article when asking for the tinned copper wire, ½" thick, available in 100' lengths for $12.50 ppd. To order by telephone, call 515/288-7237.
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PALM-SANDER HOLDER

Trying to hold a palm sander in one hand and a small project in the other can make you feel a bit like a juggler. Our holder clamps firmly to your workbench, allowing you to see your sanding progress while leaving both hands free to control the workpiece. For a proper fit, measure the shape of your sander's motor housing to determine the opening size.

To make changing sandpaper a breeze, leave enough clearance between the palm-sander pad and the top of the holder to allow you to change sandpaper without having to remove the sander.

To fit the Porter Cable 330 shown, we cut a 4” hole in a 6 × 6 5/8” block and trimmed the block to the size shown. Hole sizes will vary for other brands of sanders. 🌟

Project Design: Russell Smith
Illustration: Kim Downing; Jim Stevenson
Photograph: John Hetherington

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When we reported on 21 cordless drills in the April 1991 issue of WOOD® magazine, Black & Decker's new feature-laden Cyclones were prototypes, not quite ready for testing. B&D claimed the tools would sport an innovative clutch, so we waited eagerly to get our hands on a working model.

Recently, we ran a 9.6-volt model through a user test (B&D also offers a 12-volt Super Cyclone). Here's what happened.

One smooth operator
Before even turning on the Cyclone, the tool impressed us with its good balance and comfortable grip. A nice start. Then, we used it to assemble a 10"-long cabinet requiring more than 150 screws ranging from 1" to 3½" long. Most of the screws required pilot holes, and some needed countersinking. We completed the project on one battery charge.

Like other cordless drills priced at $150 and above, the Cyclone has plenty of nice features. All of its switches worked flawlessly, and the smooth operation of its gear-reduction lever especially impressed us. With a flip of the conveniently located lever you can change between speed ranges (0-350 rpm or 0-1,200 rpm on the 9.6-volt model 1964).

A similar lever for switching between drilling and screwdriving also worked without a hitch. In the screwdriving position, the motor engages the chuck only when you apply forward pressure to the drill. This feature, unique among the drills we’ve tested, allows you to drive more screws in less time and with greater control.

The tool's Versa-Clutch has 23 screwdriving torque levels to choose from. Clutches prevent you from burying screws too deeply, snapping off their heads, or stripping the threads formed on the walls of a wood hole.

And, the Versa-Clutch goes above and beyond the duties of a typical clutch. Just as a jockey calls on his horse to give him more effort in the home stretch by cracking his whip, you can get more driving force from the drill by simply applying greater forward pressure against the screw. For example, driving a screw into a knot or other hard spot can cause the clutch to disengage before the screw reaches its full depth. With the Cyclone, you only need to bear down harder to prevent the clutch from slipping. With other drills, you have to stop and manually change the clutch to a higher setting before fully driving the screw.

The bottom line
Black & Decker's new Cyclones are among the most expensive cordless drill/drivers on the market ($159 to $179 for the 9.6-volt model and $169 to $199 for the 12-volt machine). But, these tools are worth every penny if you do a lot of screwdriving.

Our only complaints—and they're both minor ones—in-volve the Cyclones' keyed chuck and one-hour charger. We prefer keyless chucks for their ease of use and superior gripping strength. A keyless chuck may be in the Cyclones' future, says company spokesman Allen Brelsford, but he wouldn't elaborate.

We also think that cordless drills in this price range should have batteries that recharge in a half hour or less. The Cyclones use the same one-hour Uniovolt charger packed with B&D's other cordless drills.

Note: Company officials tell us B&D will have a 15-minute charger available as an accessory item by the time you read this. The unit will charge batteries up to 13.2 volts from all major power-tool manufacturers. We'll let you know how this product performs as soon as we get our hands on one.

Written by Bill Krier
Tested by Bob McFarlin
Photograph: Hopkins Associates
Solid Oak As Seen By A Makita Circular Saw.

Don't grit your teeth. Don't even tense your muscles. You're going to make one of the hardest hardwoods seem to melt beneath your blade. Don't worry. You're using a Makita.

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SPAT OR CHAT?

FAMILY FEUD

SCROLLSAWED SILHOUETTE

Materials: Cut this authentic old-time pattern from \( \frac{1}{8} \) Baltic birch plywood. A \( 5 \times 9'' \) piece will suffice for the stand-up silhouette. You'll also need a \( \frac{3}{4} \times 1 \frac{1}{4} \times 9'' \) piece of walnut or some other hardwood to make the base.

Photocopy the full-sized pattern, opposite page. Adhere it to your stock with spray adhesive.

Since you'll be cutting thin stock, try stack-cutting up to five pieces at a time. You may have more control and be less likely to cut off some of the fine details with the thicker material.

Just stack your blanks and tape the edges together with masking tape. (Some scrollsawers nail their stacks together with small brads outside the pattern area.) Put the pattern on the top piece in the usual fashion.

Drill \( \frac{1}{16}'' \) blade start holes where shown on the pattern. Now, begin sawing with the smallest inside cuts, such as Mom's bonnet string, the area between Pop's feet, or the spaces between the chair rockers.

We found that a \#5 blade \((0.035 \times 0.015'' \) with 15 teeth per inch) handled the detailed cutting easily. Complete all inside cuts before sawing the outline.

To make a base for your silhouette, cut a piece of hardwood (we
chose walnut) $\frac{3}{4} \times 1\frac{3}{4} \times 9"$. Saw a $\frac{1}{8}"$ blade kerf $\frac{1}{4}"$ deep along the middle of the topside with a tablesaw. Round the top edges with a $\frac{3}{4}"$ round-over bit in a table-mounted router.

Mount the cutout in the slot, and give the project a clear finish. Clear lacquer in a spray can will do the trick. Spray at an angle from top, bottom, and both ends on both sides to cover the edges inside the cutout.

Now, put the talkative pair in a conspicuous place. Then, whenever you need some entertainment, you only need to look at them and ask, “What do you suppose they’re talking about?” ♦

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Design: Mostly Victorian Design
Photography: Hopkins Associates
Illustration: Jim Stevenson
EARN CASH, PRIZES FOR YOUR TOP SHOP TIP

Do you have a great shop tip (or two) you'd like to share with other WOOD® magazine readers? For each published submission, you will get at least $25 from WOOD magazine (as much as $200 if we devote a page or more of space elsewhere in the magazine to your idea). You may also earn a woodworking tool for submitting the Top Shop Tip for the issue.

We try not to use shop tips that have appeared in other magazines, so please send yours to only one. We do not return shop tips. Mail your tips, address, and daytime phone number to:

Top Shop Tip
WOOD magazine
P.O. Box 11454
Des Moines, IA 50303-1454

Turn to hammer and nails when you need a drill bit
You need to drill pilot holes for some screws, but you don’t have a twist drill the right size.

TIP: Turn a nail or Brad into a drill bit. Cut the head off and flatten the end with a hammer. When the width matches the hole diameter you need, file or grind the end to a point, as shown below. These shop-made bits work in softwoods or hardwoods, and resist breakage.

—Joe Hess, Calgary, Alta.

Router table mounts easily on tablesaw
A table-mounted router simplifies many operations, but finding space for another piece of equipment isn’t always simple.

For his tip, Robert wins a Ryobi RS 115 random orbital sander shown right.

TIP: Mount your router on your tablesaw. Simply attach the router to a piece of ¼” plywood long enough to span your saw’s fence guides. Secure the table to the guides with ¼” U-bolts, as shown below. The router fence clamps to the saw fence for easy adjustment. Both pieces store in a small space.

—Robert Speas, Winston-Salem, N.C.

Dowel provides center for boring bigger holes
You’ve drilled a 3/4” bolt hole through a project part, and now you want to counterbore it with a larger Forstner-type bit. There just doesn’t seem to be an effective way to center the bigger bit on the existing hole.

TIP: Find a piece of ½” dowel a few inches long and mark its center. Then, insert it into the 3/4” hole, placing the center-marked end up and flush with the workpiece surface. Now, employing the center-marked dowel as a guide, you won’t have any trouble getting that bigger bit started. For a hole of a different size, just use the appropriately sized dowel.

—From the WOOD magazine shop

Continued on page 22
Round and round it goes. Where it stops nobody knows.

The Dremel Moto-Tool is a compact, high-speed rotary tool that really gets around. With variable speeds, ranging from 5,000 to 30,000 RPMs, and over 150 specially designed bits and accessories, it allows you to complete all kinds of tasks, on all kinds of materials.

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If we were to list all the ways you could use the Dremel Moto-Tool, this ad would go on forever. However, you can get a 95 page, detailed guide that explains bits, speeds and 175+ uses, in specially marked Moto-Tool boxes at Hardware, Home Center and Hobby Stores. Or write to Dremel, Marketing Dept., P.O. Box 1468, Racine, WI 53406-9989, for a free copy.
**TIPS FROM YOUR SHOP (AND OURS)**

*Continued from page 20*

**Add an apron to lap tray for easy-chair carving**

Sometimes it would be nice to plunk down in the living room and relax, but you hate to give up that carving time. You could carve while you’re sitting there, but you’d draw flak for scattering chips all over the sofa and carpet.

**TIP:** Build a lap tray from scrap lumber and plywood, and then stitch up a canvas or denim apron. Arrange the apron as shown below, and then staple the hem to your lap tray. Now, you’re ready to carve in comfort.

—John Blyth, Wadsworth, Ohio

---

**More comfortable handle isn’t just a pipe dream**

Adjustment cranks on some woodworking machines have fixed handles. They get the job done, but when you need to change your setups often, those handles can raise a few blisters.

**TIP:** Take the friction out of adjustment by making a rotating handle from plastic pipe. Cut a length of PVC pipe to fit over the crank handle (½” pipe fit the drill-press table crank shown below). Drill and tap the end of the metal crank handle for a 10-32 machine screw. Then, drill a ⅜” hole through the center of a wooden disc or PVC pipe cap. Slide the length of pipe onto the handle, and secure the disc or cap with a screw and washer.

—William King, Marion, Iowa

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Plastic electrical tape holds glue joints together
Tape sure would be an easy way to clamp glued joints on a small box. Too bad masking tape tears when you try to stretch it around sharp edges.

TIP: Short-circuit that torn-tape problem with black plastic electrical tape. It resists tearing, even on sharp corners, and its stretchiness lets you pull joints up snug.
—Charles Von Herrmann, Columbia, S.C.

Plastic tubing makes pivot points sturdy
An easy way to make a pivot or hinge (as for a folding lawn chair) is to drill through the pieces and fasten them with a bolt and nut. But, metal wears the wood down, leaving a sloppy fit.

TIP: Separate the wood and the metal with plastic tubing. Select tubing that fits the bolt snugly. Then, drill through the wooden pieces to fit the tubing. Outside diameter. Cut a length of tubing as a bushing for each wooden part, and assemble as shown below.
—Bob Ketterl, Cincinnati, Ohio

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**TIPS FROM YOUR SHOP**

(AND OURS)

Continued from page 23

**Big drink cup slurps up sawdust in the workshop**

You're getting all hot under the collar trying to attach your shop-vac or dust-collector hose to a shop machine. The hose and the machine outlet don't quite mate up—you're going to have to use a lot of duct tape unless you can find some kind of adapter.

**TIP:** Relax; go down to the fast-food store and treat yourself to a big orange drink. When you get back home, rinse out the plastic cup and cut the bottom out of it. Now you have a cone-shaped adapter to go between the hose and the machine. The soft plastic trims easily, and it's flexible enough to conform to the machine's outlet and the hose end. Fasten it with duct tape or plastic electrical tape, if necessary.

—Vence Jolouchan, Florence, S.C.

**Trick ropin' saves the day when the gluing gets tough**

You can fiddle a lot of time away trying to clamp hexagons, octagons, or any of the other polygons you might build. A strap-type clamp is the easiest way to hold them for gluing, but what do you do if you don't have one?

**TIP:** Get a rope. Then drill two holes (rope diameter) through two pieces of scrapwood near the ends. Thread the rope (sash cord works great) through the wood as shown, below, and tie a knot in each end. Drill a dowel hole on an edge at one end of one piece and glue in a dowel, leaving about two rope diameters of it above the surface. Now, to clamp your work, place the wooden pieces three or four thicknesses apart and cinch the rope around the work, taking in the slack at the end near the dowel. When the rope is tight, pass its end around the dowel and back under itself to make a half hitch around the dowel. Then, draw the wooden pieces together with a C-clamp or handscrew to tighten.

—Joe Bailey, Russellville, Ark.
The virtue of a vise: taming benchtop tools

You have so many benchtop tools now that you can’t fit them all on top of your bench. You can store them somewhere else, but how do you keep a tool solidly in place when it’s time to use it?

TIP: Cut a 3/4” plywood base for each tool and fasten a 2 x 4” cleat to the front edge. Store them out of the way. When you’re ready to use one, place it on the bench and clamp the cleat in the vise.

—John Hogsett, Beaver, Pa.

Drywall screws can ease your clamp shortage

You’re laminating stock to be cut into project parts. But, you don’t have enough clamps.

TIP: Before you start laminating, transfer your pattern to the top layer. Apply the glue and build the sandwich as usual. Then, instead of clamping it, fasten it together with drywall screws driven into waste areas.

—John J. Wells, Defiance, Iowa

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 Tip: Chuck a spade bit the size of the dowel into your drill press, and bore a hole about halfway through a block of hardwood. Next, change to a bit the diameter of a steel dowel center. Piloting on the centerpoint hole left by the spade bit, drill the rest of the way through the block to accept the dowel. Then, with the center in place, put one end of your dowel into the larger hole, and tap the other end with a mallet. Bingo! An instant center mark.
—Ray Matthews, Port Clinton, Ohio

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TIPS FROM YOUR SHOP
(AND OURS)

Continued from page 25
Dowel center makes quick center finder
Finding and marking the center on a number of same-sized
dowels—for a batch of small ornaments—for instance—sure gets
tedious. It would be great to find a quicker way to do it.

TIP: Chuck a spade bit the size of the
dowel into your drill press, and bore a hole about halfway
through a block of hardwood. Next, change to a bit the diameter
of a steel dowel center. Piloting on the centerpoint hole left by
the spade bit, drill the rest of the way through the block to accept
the dowel center. Then, with the center in place, put one end of
your dowel into the larger hole, and tap the other end with a mallet.
Bingo! An instant center mark.

—Ray Matthews, Port Clinton, Ohio

MORE TIPS FROM OUR WOODWORKING PROS
Here are some of the other handy
tips you'll find in this issue of
WOODS magazine.

• See how we cut slots for spline joints with a tablesaw, regular blade, feather board, and tall auxiliary fence. It's on page 51.

• For hoot, wobble-free shelves, make the scrapwood shelf-hole template shown on page 54.

• Don't need a toboggan? Laminating, described on page 67, also will make bent parts for rocking chairs or other projects.

• Use the stepped-scarf joint shown on page 68 when you need a strong end-to-end joint.
What You Should Know About Making $1,000 a Week in Your Spare Time.

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Interchangeable inserts for tablesaw blades and dadoes

Do you like the splinter-free cuts you get when your tablesaw throat plate hugs the blade, but you find it tedious to make and fit a new one every time you change blades or angles? The Wood Dynamics throat plate may rescue you.

Made of heavy ½” aluminum, the plate sports an oversized dovetailed slot, which accepts interchangeable wooden inserts. In my tests, the plate slipped easily in and out of my Powermatic 66, and remained stable and flush with the tabletop. The provided wood inserts slide firmly into the throat plate, leaving no slop. I made additional inserts easily for other blades by raising the spinning saw blade through the installed insert, I achieved a perfect fit.

During tests on my saw, I got the clean, chip-free cuts you expect when you have complete support on the bottom of your workpiece. My dado test cuts in plywood were splinter-free. A well-fit homemade plate will yield cuts just as good, but doesn’t change as quickly and easily.

Price is the throat plate’s biggest liability. But, if you demand precise cuts, and would rather spend your money than your time, this shop aid may be worth the bucks.

—Tested by Bill Krier

Roll-your-own drum sanders

Here’s a cleverly designed drum sander that lets you save money by using your own sandpaper. I tested two Singley drum sanders—the ¼ x 3” and the 3 x 3”—on my drill press and found them well-made and well-balanced. At the recommended speed of 1750 rpm, they removed stock evenly and quickly.

It took some practice to pull the sandpaper taut over the spongerubber backing and lock the ends in the drum slot. Sanding sleeves are more durable and clean up more completely than most sheet or roll papers, but my sandpaper didn’t tear during sanding or when I used my belt cleaner.

—Tested by Steve Oswalt

Snigley Drum Sanders, available from Woodworker’s Supply in six sizes from ¼ x 3” to 3 x 6”. Costs range from $15.95 to $29.95 plus shipping and handling. Order by calling 800/645-9292.
Refinish faster and safer
Lots of strippers can remove the finish from that old garage-sale table, but generally, the quick-working ones are toxic and the safe ones are slow. Woodfinisher's Pride stripping gel, manufactured by Creative Technologies Group, are fast like the methylene chloride strippers and safe like the dibasic-ester strippers.

Between the two Woodfinisher's Pride products, you can strip varnish, shellac, and polyurethane, as well as latex and oil-based paints. In my 60° basement last winter, I used the varnish remover on a garage sale antique end table, and the paint remover on an antique bed. Each worked in 30 to 40 minutes. The original finish and stain came clean from the table with a single coat. The bed, which seemed to have been painted with latex, required one application for each of the two coats of paint.

You can use steel wool with this stripper—an advantage over other non-methylene chloride strippers. Grain raising is minimal. Other advantages: they don't dry out as quickly as the methylene chloride strippers, and have no noxious odor.

—Tested by Bill Krier

Woodfinisher's Pride, suggested retail $8.50 per quart, $14.99 per half-gallon. Available at homecenters and hardware stores. Call 800/457-7433 for a local distributor or to order direct.

Continued on page 31
Another "buy 1 tool get our 228 page tool free" offer.

Just a few of the unique woodworking tools of the 3,500 others available from our most versatile tool, the 1992 Garrett Wade Catalog.

The 228 page catalog is free with any order from this ad. Or if you would just like the catalog, send us $4.00 with your name and address.

A / 2 Band Saw Books by Mark Duginske
Learn what makes your bandsaw tick. Tune-up and maintenance; blade selection, tracking and tensioning; plus cutting methods for various woods and other materials. Hundreds of tips and shortcuts. Unlock your saw’s potential.

02L09.03 Band Saw Basics $ 9.95
16L04.02 Band Saw Handbook $16.95

B / The Saw Setting Gauge That Can Be Read From Any Position
Most gauges have at least one or two main weaknesses. They either rest partially on the insert plate which is usually not the same height as the main table, or are too thin that it is difficult to ensure that teeth are being gauged at the top of the arc. This gauge is made from machined 9/16" thick aluminum and is 9" long. With 9/16" graduations on one end and 3/8" on the other, it will indicate any height from 3/8" to 2". Most useful for table saws but also handy for routers. The markings are vertical on one face and horizontal on the other, so you can read them easily and accurately.

71K26.02 Saw Setting Gauge $17.95

D / Our 202GF Gap Filling Glue Fills Gaps
It has a very high solids content so that small gaps in our joinery are actually filled – with strength. And the "squeeze-out" beads right up and chips off when dry. No sawing in to ruin finishes. Dries to a light tan. Water clean-up.

62J01.01 1 pt. 202GF $ 7.25
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C / 3/16" Super Narrow Blades
You may have never seen a blade like this. A 24tpi raker style, it produces smooth cuts while making incredibly tight turns. We recommend using our Cool Blocks with these delicate blades, because they can be set closer to the blade without danger of overheating.

Cabinemaker’s Special Bandsaw Blades
A Garrett Wade exclusive. They look like "skip tooth" blades. But each tooth is actually formed as a hook, with every 5th tooth an unset raker. The result is a very smooth cutting blade that feeds easily. 3/16" blade is for general work, and 3/8" for resawing and heavy straight sawing.

93 1/2" Blades (Delta 14" and copies)
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72" Blades (Shopsmith)
33K13.01 3/8" Scroll $14.95
33K13.02 3/4" Cabinet $11.25
33K13.03 3/8" Cabinet $11.95

E / The "Blind Nailer" Used To Be A Staple In Every Finish Carpenter's Tool Box
This unique tool allows you to set nails or brads invisibly. Slip the special chisel, with its finger nail shaped cutting edge, into the positioning jig and tighten the clamping screw. Place the flat sole on the wood and strike the end of the chisel with a firm tap with the palm of your hand. The Blind Nailer will lift a perfect small chip from the surface. Hammer your nail or brad in and then glue the chip back in place.

44K01.04 Blind Nailer $19.95

F / Special Bandsaw "Cool Blocks" Prolong Blade Life & Increase Accuracy
Made of a special graphite impregnated Phenolic laminate, this set of 4 replaces your upper and lower side blade guides. Cool Blocks run cooler and are more slippery than conventional steel guides. Since they can be set actually touching the blade, they give you better control of the cut.

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33K09.06 "F" Jet 14" (fits Delta copies) $11.95
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Bit cleans dado bottoms

If your dado blade doesn’t make the flat-bottomed cuts you require, you can still get striking results by following up with new bottom-cleaning router bits from Paso Robles Carbide. The bits, available for ½” collets in ⅛”, ¼”, and ⅜” sizes, will smooth and square bottoms of existing grooves or dadoes.

In testing the ¼” bit in plywood, oak, and pine, I found it consistently leveled rough or concaved bottoms (see Dado Cutting Tools, page 60).

The clean-out bit will slightly deepen your dadoes and grooves, so make allowances. With my router, I needed fast passes to prevent burning.

Because most plywood is undersized these days, you’ll need to cut narrower dadoes to snugly hold a “¾”’” plywood shelf. That means you’ll want to use the ½” or ⅜” bottom cleaner, in that dado. Use the ¾” bit with a router table for dressing rabbets, mortise-and-tenons, and halflap joints.

—Tested by Bob McFarlin

Freud Factory Rebate.


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Biscuit joining is rapidly becoming the preferred method of joining wood. With the Freud System you can create an exceptionally strong joint that is quicker and easier than doweling or other methods.

The Freud JS100 joiner system is designed for the woodworking professional who relies on his power tool. It has an industrial duty cast housing, a solidly built drive system and a powerful 5 amp motor that will provide many years of service. But the performance from any power tool depends on the quality of the blade or cutter. Freud is world renowned for carbide cutting tools and the blade for the JS100 is made using the same advanced technology in the same factories. With this system you get a carrying case, blade removal tools, sample bag of biscuits, complete instruction manual and our special lubricant. Combine all this and you will understand why this has been the tool preferred by many professionals, and leading authorities in the field.

Now is the best time to buy the Freud JS100 Joiner System. Go to your participating dealer and get your best price and we will send you a check for $30.*

If you're looking for a power house of a router look no longer. This machine has both the power and features you have been looking for. It is rated for 3 1/4 developed horsepower at 15 amps. This is the most power you can get from a hand held power tool that will run on standard household current. The technically advanced collet system on the FT2000 is the longest collet available to secure bits even under heavy load. This machine is also packed with many other features like the reverse flow fan to keep the work surface clear and the ergonomically designed handles for maximum control and comfort. But the one feature that makes this the ideal machine is the Micro-Adjustment Knob. Router table operations are a dream because micro cutter height adjustments can be easily made.

This solid work horse has always been an excellent value but if you buy one now from a participating dealer we will send you a check for $30* that you can spend on bits, wood or just put in the bank.

*Rebates available only on Freud JS100 and Freud FT2000 purchased from participating dealers between September 1, 1991 and January 31, 1992.

Precisely what you need.

For the name of your participating dealer or full details on the rebate call 800-472-7307.
TEAK

The tropic’s top seafaring stock

Sailors and traders visiting India and China in the early 1800s were caught up with the wood they found in widespread use as seagoing stock. Teak, with working and structural properties surpassing even those of their traditional oak, soon became the prime nautical wood of Europe and America. Weather-resistant, tough teak still ranks as the favorite for boat decks and trim. But, it's the story of how this hardwood arrives in craftsmen's hands that rivals its history.

Teak harvesting begins with the girdling of selected trees deep in a Southeast Asian rain forest. This allows the timbers to die and dry on the stump over a period of years, making them tons lighter at logging time. Because of the terrain and its remoteness, elephants play a major role, moving the massive logs miles to a river. There, the teak lies for months, awaiting monsoon rains to fill the banks so it can float from the interior. In traditional forest harvesting, this seasonal reliance often results in a five-year delivery time.

Wood identification
Teak (Tectona grandis), a native species in the rain forests of Burma, India, Laos, and Thailand, now grows in about 40 countries throughout the tropics. In Java, for instance, teak was planted generations ago, and the trees are managed for sustained yield.

Naturally occurring teak grows to heights of 100' and diameters of 12' or more in about 300 years. Plantation-grown teak gets taller, but never as large in circumference, although it can be harvested in 60 years.

If size alone didn't distinguish teak from other rain forest trees, its enormous leaves would. They can measure a whopping 24 x 36", and their top surface is rough enough to sand with!

Teak has a thin layer of yellow sapwood, but it's never seen by woodworkers. Importers and dealers instead favor boards of only coarse-textured, golden-brown heartwood. Teak, though, depending on its growing conditions, may have a greenish tint, small stripes of yellow and darker colors, or an occasional mottle figure. At about 40 pounds per cubic foot dry, teak weighs slightly less than oak.

Silica, which the growing tree extracts from the ground and distributes throughout the wood, gives teak an oily feeling and causes finishing problems. Freshly sawed boards also carry the aroma of old shoe leather.

Uses in woodworking
Because it defies the elements, teak makes the perfect candidate for garden furniture and outdoor structures. Indoors, teak always has been prime stock for cleaned-up furniture, as well as all forms of cabinetry.

Cost and availability
The Burmese set the grading and pricing standard for teak over 100 years ago. That's why teak's price goes up with the width and length of the board. For instance, First European Quality teak boards 1" thick will be at least 8" wide and bring a premium of $8 or more per board foot. Narrower boards cost less.

Prime teak-faced plywood runs considerably more than red oak or cherry panels, but at around $85, falls below the cost of walnut. Veneer prices fall into the $1.50 per square foot range of most imported species.
Teak
(Tectona grandis)

Woodworkers with lots of experience working teak say that in old-growth trees from Thailand and Burma, the silica in the wood has broken down, making it easier to machine. However, younger, plantation-grown teak has practically the same performance qualities as old-growth and you'll notice little difference in machining, although the color may vary, depending on the conditions at the location where it grew.

**Machining methods**
Because teak does vary in color according to its origin, try to buy all the boards you need for your project from the same shipment so the overall tone of your project will be uniform. *When working it, keep these tips in mind:*
- Due to its silica and oil content, teak slides easily over a machine's iron bed. You'll have no problem planing and jointing it, except that teak does dull blades more quickly than other hardwoods.
- In spite of its hardness, teak rips and crosscuts more easily than oak. Always use carbide blades.
- Teak poses no routing problems, but it quickly dulls bits.
- With proper woodworking drill bits and high speed, you can put clean holes in this wood without breakout.
- Sanding teak requires frequent stops to clear its sticky dust away with a stiff brush. **Caution:** Some people have an allergic reaction to teak dust.
- Epoxy or resorcinol adhesives work best when joining teak. But first scrub all wood to be joined with acetone, then let it dry.
- Finishing teak poses the most difficulty. The wood doesn't take stain exceptionally well, and traditional clear finishes (except lacquer) can be a problem. For instance, regular polyurethane won't set up. But two-part polyurethane, the type for marine use, will. That's why teak is frequently coated with a penetrating oil, such as tung or teak.
- For outdoor use, teak doesn't require a finish, only an occasional scrubbing with soap and water to clean the surface. The wood will eventually weather to a pleasing gray color.

**Carving comments**
Teak ranks high in hardness, but you can carve it with chisels and a mallet.
- The wood takes fine detail. However, the silica in the wood dulls chisels in no time.
- Take shallow cuts, despite how easily the wood seems to slice away, or else your cutting edge may wander in the coarse-grain.
- Power carvers should arm themselves with carbide cutting burrs to endure this wood.

**Turning tricks**
Except for its tendency to dull tools, teak turns exceptionally well in response to shearing cuts. Some teak, though, primarily from India, may be somewhat brittle and coarse-textured, causing chipping or splintering.

### TEAK AT A GLANCE

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Compiled with woodworkers Jim Boelling, Jim Downing, and Sam Radding  Photograph: Bob Calmer  Illustration: Steve Schindler
HEDGE RUSTIC

Kansas craftsman Bud Hanzlick transforms a neglected native hardwood into everlasting Adirondack-style furniture.

Continued
Nothing escapes the bright yellow dust in Bud Hanzlick's Belleville, Kansas, shop. His drill press wears a thick coat. So does the radial-arm saw across from it. And in a corner of the room, the lathe sports a golden cloak.

“Making these integral dowels really kicks it up,” Bud says, sweeping a large hand across his denim-covered chest. He nods to the small ocher cloud just created, “But, boy, I like this wood.”

No matter what you call Bud's curry-colored stock—bois-d'arc as the early French explorers did, Osage-orange as do the wood technologists, or just plain hedge as a Kansan like Bud does—you can't help but marvel at its sturdy handsomeness. Bright and rock-hard, *Maclura pomifera*, belongs to the same family as the mulberry and the fig.

**A rustic revival**

Even before he started crafting his rustic furniture, Bud had always worked wood, one way or another. Adding on here and there over time, he built the cozy frame home he and his wife Pat share. Their kitchen even features oak countertops and floors he made of planks salvaged from a nearby church.

With an old drawknife, Bud scrapes off the outer bark of his hedge fence posts to reveal the colorful wood beneath.
But it wasn't until Bud, for 20 years a Rock Island Railroad switchman, got laid off six years ago that the idea of rustic furniture clicked. "I was wondering what to do with all my free time," Bud recalls. "Then I was out at the farm one day and spotted a barn post of hedge that the cows had polished smooth. It was darn nice. Why not make furniture out of it?"

No one that Bud knew had ever worked hedge into furniture, or anything except fence posts for that matter. But that didn't stop him. He rounded up some old hedge posts and a few sawed slabs and made a bench.

"I made a few more benches, then a chair or two," Bud remembers, "always trying to improve." The pieces looked rustic, but he thought that an honest use of the material. Hedge is rustic. Now, Bud offers chairs, settees, tables, benches, coat racks, and planters.

**Hedge has history**

"Hedge is just as tough as the pioneers around here that planted it," notes the raw-boned 58-year-old, ready to relay some background.

Originally confined to the Red River area of Oklahoma, Arkansas, and Texas, Osage-orange was widely planted by settlers in farming areas from western Kansas to the East Coast. Before barbed wire, the thorny, fast-growing trees made excellent fences. "In fact," Bud says, "depending on how thick it grew, even chickens couldn't get through."

According to Bud, whose ancestors helped settle the barren plains, farmers planted Osage-orange heavily along Kansas fields in the mid-1800s. "The state even paid folks to put it in," he says.

But history relates that Bud's hedge served other purposes, too. First, the Osage Indians shaped top-notch bows from it. Then, the tough-as-nails wood became wagon-wheel hubs and rims, bridge pilings, railroad ties, pulley blocks, and even paving. The dye industry used extract from it to produce yellow, tan, and khaki. And the tree's large, rough fruit—*apples* in hedge country—fed wildlife, and ground-up, fed livestock, too.

Hedge's role changed as agriculture grew, however. Fences occupied less space than trees, and mechanization meant larger fields. So, down came the rows of hedge. Thirty years ago, Bud helped harvest the hedge on area farms, turning it into fenceposts.

Continued

Because the hard hedge would quickly lay waste even the best carbide turning tools, Bud saws the round tenons at his lathe.
“You can’t beat hedge for posts,” Bud points out. “It won’t rot, and it resists insects and weather. They’ll last 60 years sunk in the ground. We used to get 75 cents for a post back then. There’s still some farmers that will pay $4 for a brand new one.”

Over the years, farmers harvested most of the nearby hedge. That means Bud has to go farther and farther for his wood. “The big stuff that I have sawed into boards at the mill comes from a guy who contracts to log out hedge between fields. But mostly, I get by with old, pulled fence posts or unused ones that I find at farm sales,” he explains.

**Metal meets its match**
Most woodworkers shun hedge. True, the wood has a refreshing yellow color when first sawed. But before long, it turns a dark orange-brown. Then, too, it seldom comes in very large pieces because the tree rarely grows big. And any hedge will likely have knots, holes, and ingrown bark. It’s also difficult to season. But it’s machining hedge that tries a woodworker’s patience.

For his furniture’s arms, legs, and stretchers, Bud selects small-diameter posts from his outdoor stockpile. Then, he scrapes away the weathered-gray, dirty bark with a drawknife. Next, he attacks the surface with a wire brush chucked into his portable electric drill. The result: cleanly furrowed reddish-orange stock, and dis-abled tools. “In two days of cleaning up posts, I’ll wear a new steel brush down to the nubs,” he says. No wonder. Hedge has the tightest of grain and rates twice as hard as hickory. That’s enough to topple any cutting edge.

“The carbide blades I put on my saw only last about two months,” notes Bud, “and I have to constantly sharpen my spade bits.” Bud doesn’t even count all the chainsaw chains he’s retired before their time, or the grimace he gets from the shrugging sawyer when he brings large chunks to the nearby sawmill.

But this Kansan is actually thankful for all the fuss and bother. Because that means he’s about the only one drawing on the dwindling local supply. “Most folks don’t even gather it for fireplace wood,” Bud comments. “It’ll spark and kick a glowing coal out four feet.”

Prices for his Bekan Rustic Furniture go from $25 for a small bench to $150 for a chair and $250 for a settle. He markets his work at craft fairs, but gets lots of direct orders, too. “Pat and I even drove a pickup load back to a Pennsylvania buyer last year,” an-

A hydraulic jack pins the stick of twisted wood in place for drilling the mortise. Note how Osage-orange’s yellow dust coats the work area.
nounces Bud. Grinning, he adds, “And I could have sold all of it at rest stops along the interstate highway before we got there.”

**Joinery that takes abuse**

Bud’s chosen stock grips nails and screws in a hammerlock. The hitch is starting them, then driving them home.

The craftsman admits to some trial-and-error before he hit on the right joinery, though. He first tried bolting his hedge furniture together, but it appeared too clumsy. Next came drywall screws—not right either. Plain old nails worked (predrilled holes, of course), with lots of effort. The technique that won out, although it took more machining, was mortise-and-tenon joinery. Bud calls it “integral doweling.”

“I form a 1” diameter, round tenon on all my chair legs, arms, and stretchers,” he explains. “Then, say in a chair arm, I’ll drill a hole to accept it. When it’s glued up, that joint will last as long as the wood.”

In an unusual machining technique, Bud saws the round tenon while the wood spins on the lathe, as shown in photo, page 37.

The 1” hole Bud drills in the chair arm will receive the tenon of the leg. On some furniture, Bud leaves the tenon exposed as a detail.

At one end of the lathe bed he mounted a portable circular saw that slides back and forth on a carriage. When he chucks a hedge stick in between centers and sets the lathe spinning, he turns on the saw. By moving the saw blade gradually against the stick, and the chucked-up stick back and forth along the bed with a cranking mechanism, Bud shapes a tenon in a minute or two.

To accurately drill the 1”-diameter mortises in round pieces of hedge, Bud rigged up another unusual fixture. He built an open-sided box to rest on the drill-press table. Then, to keep the often-crooked pieces from turning under the bit, Bud installed a small hydraulic jack at one end of the box. “When I put the stick in place, I squeeze it in tight with the jack,” he says.

Other than the tenon-making at the lathe and the drill-press operation, Bud’s furniture stock receives little machining. “I don’t plane my boards, just smooth them up with a belt sander,” he comments. “The wood in rustic furniture shouldn’t be slick.”

Finishing? Forget it. “Hedge really doesn’t need any finish. Outdoors, it’s going to weather to gray and last forever,” Bud says. “Indoors, it’ll darken some no matter what you do, especially if it’s in sunlight. But the wood doesn’t need protection. A finish would just darken it.”

You have to take Bud’s word for it. After all, he’s probably the only craftsman making hedge furniture. Besides, Bud offers a guarantee: “If it doesn’t last, I’ll furnish you with a new piece!”

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For a brochure describing Bud’s hedge furniture, write:

Bekan Rustic Furniture
P. O. Box 323
Belleville, KS 66935.

Written by Peter J. Stephano
Photographs: Perry Struse
Carve a Desiree Hajny original

HERE'S OTTO

Blue-ribbon wildlife carver Desiree Hajny created Roscoe the Raccoon for WOOD® magazine readers in the June 1989 issue. You responded enthusiastically, so we asked her to design another lifelike animal carving for you. Well, gather your gouges, gang; it's time to meet Otto the Otter.
Few creatures appear to enjoy life as much as otters. Invariably, they're shown sliding down slippery slopes, lolling about in the water, or just generally romping.

With this zesty personality in mind, champion wildlife carver Desiree Hajny perched Otto on a river rock, alert and itching to jump in. You almost can see Otto's tail switching as he surveys his stretch of river.

Get Otto into shape first
Unless you're starting with the precarved roughout, trace the full-sized front- and side-view patterns onto your carving block, and bandsaw to shape.

Before you start carving, study Otto's build, the shape of his head, and his facial contours in the photos and illustrations. Then, begin carving with your knife and small gouges.

Turn your carving frequently as you work. Don't concentrate too much attention on any one area at this stage. Instead, remove wood from the entire carving to get the proper overall shape and proportion. And, allow yourself some room for detailing the head and face. About ½" of extra wood there should do the trick.

Continue your Otto-body work
Strive for a flowing surface as you carve Otto's body. Otters are sleek animals, so don't make yours too cylindrical or chunky.

If you were to cut a section across Otto's middle, you would have a triangle with bowed-out sides and base. His backbone ridge (most prominent between the shoulders and hindquarters) represents the tip of the triangle; his belly, the base.

The ridge disappears at the hips, Otto's widest point. Moving up front, study the photograph opposite page bottom before carving the shoulders and chest. Notice how the muscles appear like another layer, molded to the body.

Give Otto solid footing
Otters live around water and eat fish. To get about on soggy land, propel themselves through water, and snag food from the river, they have webbed, clawed feet.

Carve each foot to approximate shape; then, divide each into five toes with V-cuts (see illustration, page 43). Don't separate them completely—the feet won't look webbed if the cuts are too deep or too wide. Pick out the claws with your knife tip.

Put a good head on his shoulders
As the body takes shape, begin removing the excess wood from the head. Make the head about as thick as the neck from the side view, a little wider than the neck when viewed directly from the front. Otto's backbone line flows smoothly up his neck to the top

Continued next page

Tools and Supplies

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<td>Basswood, jelutong, or other carving wood, 3×5×5&quot;. Or, order a 70 percent precarved basswood roughout, shown left, for $12 (two for $22) ppd. in the U.S. from Rossiter Roughouts and Carving Supplies, 1447 S. Santa Fe, Wichita, KS 67211, call 800/8-BLANKS.</td>
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HERE'S OTTO

of his head, where it changes to a slight depression (photo below).

From the side, Otto's head shows two major forms: a rough circle encompassing the ears, eyes, and jawline, and a blunt, half-egg shape for the muzzle. Viewed from the top, the head features appear slightly squared.

Shape the head with small gouges and a knife. The scoop-like ears sit low, near the back of the head. Carve slight hollow spots in front of the ears, on the muzzle at the inside of the eyes, on top of the head, and under the nose.

With your knife, carve the nose as a baseball diamond shape with rounded upper sides. Place the eyes about midway along lines extending from the tip of the nose to the ear on each side, about the point where the egg-shaped muzzle joins the rounded head.

To carve the eyes, cut a gentle arc shape pointing upward with a downward-pointing one beneath it. Then, outline the eye with a series of curved stop cuts and carefully round the eyeball.

Complete carving the riverbed rock for Otto's perch. Then, sand or burnish Otto's head and body to smooth the contours and remove tool marks.

To burnish, rub the surface with a blunt object to compress the wood fibers. Some carvers do this with a small piece of wood while others use metal. An old teaspoon makes a good burnishing tool. With this done, you're ready to paint or woodburn the fine texture of Otto's fur.

First, study the illustration opposite page. Notice how the hair grows, and the way it follows the contours of Otto's body.

Don't forget his fur coat

If you paint Otto's coat, seal the bare wood with tung oil or spray lacquer before you start. This prevents the paint from soaking in. Paint the fur with a fine-tipped brush, size No. 1 or smaller.

Otto looks more realistic with his fur texture woodburned, and then painted. With a fine detail point on your woodburner, burn short, curving strokes in layers.

For shiny nose and eyes, seal them with the side of a hot woodburning tip. The seared wood won't absorb tung oil (applied later), and will look shiny. You also could paint the nose and eyes.

The top of Otto's head shows a slight depression. His ears sit low on the sides of his head. Note the nose shape.
with flat black paint, and then apply gloss varnish, clear fingernail polish, or clear epoxy over them.

**Give Otto some color**

Study the color photos and refer to the Finishing Materials and Paint Colors listings, right, before you begin painting your carving. Thin your paint. Make it watery, almost a wash, so the pigment doesn’t fill in the woodburning marks or carved details.

Start with light colors and work toward darker shades, blending color changes to avoid harsh lines or a zebra effect. To build color, put on several thin coats.

Allow the paint to dry, and then dry-brush Otto with a mixture of white and brown paint. As the technique’s name suggests, you start with a dry brush. You’ll get better results if your paint is a little thicker, too.

Dip the brush into the paint lightly. Better yet, pat the paint surface with the brush just enough to pick up a hint of color on the bristles. Then, brush your carving with light, quick strokes. Your best strokes will be the ones where you darn near miss Otto altogether with the brush.

You’re not trying to put another layer of paint on Otto when you’re dry-brushing. Rather, aim to put on the slightest amount of color as a frosty-looking highlight.

Mix some shades of gray for Otto’s rock, and paint the base with browns and golds to represent a streambed. Dry-brush the rock and streambed with a light gray.

Inspect your work, and then sign and date it on the bottom. Finally, coat your carving with low-gloss tung oil.

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**Finishing Materials**
- acrylic artist's colors in parchment, dull white, bright white, black, brown, gold, and silver
- sable or camel-hair brushes, sizes 00, 0, 1, and 3
- low-gloss tung oil

**Paint Colors**
- Spots on muzzle, nose, eyes—black
- Feet—brown-black (add black to brown)
- Belly, chin, chest, lower muzzle, neck—buff (add white to brown or parchment)
- Ears—brown
- Back, top of head, nose, tail—varied brown shades
- Rocks—varied grays
- Base—gold, varied browns

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*Written by Larry Johnston with Desiree Hajny
Photographs: Hopkins Associates
Illustrations: Desiree Hajny, Jim Stevenson*
For all of its virtues—stability, strength, and good looks, to name a few—a sheet of hardwood plywood can present some real challenges to the woodworker. For example, cutting a 4X8' sheet down to size without a lot of rigmarole, or cutting through its thin surface veneer without splintering, can be time-consuming or downright frustrating. And, how do you go about hiding those unsightly edges?

To help you deal with these and other problems peculiar to plywood, we've assembled 10 of our best tips and jigs.

Now, bring on the plywood!

**1. HOW TO SHOW YOUR GOOD SIDE WHEN CUTTING**

Circular saw-blade teeth create few splinters as they enter a veneered surface, but may create a lot of chipout as they exit the workpiece. So, always position your stock as shown.

- Position the best face down when cutting with a portable circular saw.
- When using a radial-arm saw, position the plywood's best face up.

**2. ZERO-CLEARANCE INSERTS ADD UP TO IMPRESSIVE TABLESAW RESULTS**

To minimize splinters on the underside of the workpiece—something that's especially important with a dado blade—make a zero-clearance insert for your tablesaw. Here's how:

Trace the shape of your tablesaw insert onto a piece of ¾" plywood (some smaller saws may require ½" plywood or tempered hardboard). Cut just along the outside of this line, and then sand back to the line.

To cut the zero-clearance slot in the insert, you first have to install a blade that's at least 1" smaller than the largest blade that the saw handles (9" blade in a 10" saw). The outside blades of a stackable dado set work well if you're making the insert for a ¾"-kerf blade. This is necessary because fully sized blades will interfere with the following steps. If you're making the insert for a dado blade, install the dado blade adjusted to its desired cutting width.

With the saw blade fully lowered, check the fit of the plywood insert. To set the top of the insert flush with the tablesaw top, apply dabs of hotmelt adhesive to each of the insert supports as shown below. Allow these dabs to harden slightly (5-10 seconds should do it), then install the insert and push it down flush with a straightedge as shown below. If the insert sinks too low, just pop it off, apply more hotmelt adhesive, and try again.

Now, cover a portion of the insert with your rip fence. Be careful not to place the rip fence directly above the saw blade.
A Hassle-Free Way to Crosscut Long Stock on Your Tablesaw

Crosscutting a long piece of plywood on a tablesaw can be a dangerous—if not impossible—proposition. It doesn’t have to be.

Clamp a straightedge onto the bottom of your workpiece and guide the straightedge along the edge of the tablesaw extension as shown below. If the extension casting has a rough edge, or protruding bolts, you’ll have to add a wooden strip to it for the straightedge to glide against. If you add such a strip, make it the necessary thickness so the blade-to-straightedge distance is a round number.

Two Ways to Gain the Upper Hand on Glue Squeeze-Out

Glue squeeze-out can do a real number on your finish if allowed to seal the surface of the wood. Unfortunately, these blemishes usually only reveal themselves after you apply a finish. We use two substances—oil and masking tape—to block squeeze-out from coming in contact with the wood.

As shown at the top of page 47, you should first apply the masking tape to surfaces adjoining the dado. Then, dry-fit the mating piece into the dado, and apply tape to the exposed surfaces of this piece. Separate the two pieces, apply glue, clamp, and allow the squeeze-out to form a tough skin before gently peeling away the tape.

Masking tape may not stick to all woods, so we occasionally use Watco natural oil as shown at the top of page 49. First, dry-fit the adjoining pieces, wipe oil where the squeeze-out will occur, separate the pieces, and glue them together. With a sharp chisel, carefully shave away the glue squeeze-out after a tough skin forms.

Before using this method, test the oil’s compatibility with the finish you will apply over it. The oil will blend nicely with most stains, but may discolor a clear-finished piece.
Many of us don't have tablesaws or workshops large enough for ripping full sheets of plywood. What we need is a system for getting good results with portable tools. You can use a router for smooth cross-grain cuts, or a portable circular saw for fast ripping. The edge guide shown at right accommodates both tools. (You can make the guide for use with just one tool, as we did with the guide shown at the top of page 45 and in the photo at bottom right.)

Make the 1/4" base wide enough so you can trim one side to width with your router as shown in the drawing at right middle and the other side with your saw. This way, the router bit or saw blade trims the 1/4" base so you can align this edge with the marks on your workpiece for quick, precise results. We made our edge guide 8' long so it handles almost any plywood job.

You must use the same saw and blade, and the same router and bit, with the guide at all times, so it helps to write the make and size of these tools on each side of the guide. Otherwise, the edges of the guides will not align with your cutoff marks as required in the following step.

To make a cut, line up either of the trimmed base edges with your cutoff marks, clamp the edge guide in place, and cut away. As shown in the photo at right, we prefer to support the workpiece on top of several 2 x 2s resting on top of sawhorses.

Use several 2 x 2s to make an inexpensive support that prevents you from cutting into your sawhorses.
**6 HOW TO GET THE EDGE ON PLYWOOD**

Plywood components such as shelves require edging of some sort, and we prefer solid wood over edge banding because of its durability and natural look.

First, glue a ¼"-thick strip of wood onto the edge and trim it as shown at **right**. If you want the edge to look as inconspicuous as possible, trim it to ⅛" thickness as shown at **far right**.

**7 GETTING CORNERED WAS NEVER EASIER**

Like edges, plywood corners need disguising. Here's how to handle rabbeted and mitered corners.

For rabbeted corners, glue a ⅛"-thick trim piece onto the edge of one of the workpieces, and follow the sequence at **right**.

When faced with a mitered corner, we insert a ¼" spline for increased strength as shown **below left and middle**. If the corner doesn’t align perfectly, add a ⅛×⅛" strip as shown in the detail drawing **below right**. Sand the strip smooth with the surface.

*Continued*
To cut dadoes with a router, you need this jig

8

Routers equipped with straight or spiral bits cut clean dadoes but have one drawback: you can’t adjust the bit for different cutting widths. Until now.

With the jig shown below, your router, and a single straight bit, you can cut dadoes in widths that range from your bit's width to twice your bit's width. For example, with a 1/4" bit you can cut dadoes from 1/4" to 1" wide.

With this jig you can rout tight-fitting dadoes every time.

To build the jig, see the drawings and Bill of Materials at right and below. We sized this jig for routers with 6" bases. If your router has a larger or smaller base, you'll need to change the length

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STOP BLOCK

# 8 x 1 1/4" F.H. wood screws
5/16" hole countersunk
5/16" hole, 5/16" deep, with a 5/16" hole centered inside
5/16" nut epoxied into hole in (G)

# 8 x 1 1/4" F.H. wood screw
5/16" hex-head bolt

11/2" 3/4" 7/8" pilot hole 1/2" deep

Note: Matting is a 3/4" pilot hole 1/2" deep
of parts B accordingly. The jig will handle stock up to 25" wide, but you can make parts A and D longer for larger workpieces.

To use the jig, adjust part D so it's parallel to part A and separated from part A by the width of the router base (place the router base on top of parts B to make this adjustment). Turn the carriage bolts mounted in parts C counterclockwise until they contact part D.

Now, turn the carriage bolts clockwise as many revolutions as necessary (each revolution equals $\frac{1}{6}"$) to make up the difference between the width of the straight bit and the width of dado you need. For example, if you need a $\frac{3}{4}"$ dado, and have a $\frac{1}{2}"$-diameter straight bit in your router, back away the carriage bolts $\frac{1}{4}"$ (four revolutions). Mark the carriage-bolt head with a single dot near its rim so you can keep track of the number of revolutions. Now, lock down part D by tightening the nuts that hold it.

For a tight-fitting dado, test your adjustments by making some cuts in scrap stock. Clamp the jig to the scrap stock and feed the router along part A in the direction indicated by the arrows on the jig. After completing this cut, feed the router along part D in the opposite direction. As you enter and exit the cuts, the bit will also cut dadoes in parts B. This won't harm the jig, so long as you don't make cuts deeper than $\frac{3}{8}"$. If you make a deep cut, replace parts B.

To cut stopped dadoes as we're doing in the photo opposite page, just secure the stop block in place by turning its hex-head bolt.

**9 THIN PIECES WITH STRENGTH AND GOOD LOOKS**

Some workpieces—such as fine toy parts or scroll-sawed ornaments—have to be thin (3/4" or less) and strong. The problem: Solid stock won't hold up, and you might not be able to find plywood in the necessary thickness or species. Even if you can find the right plywood, it's likely to have an inner ply of a contrasting wood. Yuck!

The solution: Cross-laminate several layers of veneer of the same species as shown at right. Apply an even layer of white woodworker's glue between the veneers and secure the sandwich with clamps. After drying overnight, your homemade stock will have strength and good looks.

**10 HOMEMADE PLYWOOD LOOKS GREAT ON CABINETRY**

The next time you need $\frac{3}{4}"$ plywood with only one good hardwood face, consider laminating $\frac{3}{4}"$-thick hardwood plywood to a substrate of fir plywood or particleboard. Why? The cost of these materials (plus the necessary glue) usually amounts to less than the cost of a sheet of $\frac{3}{4}"$ hardwood plywood of the same square footage. And, in our trips to lumber outlets, we've often found $\frac{3}{4}"$ plywood (especially oak) that looks far better than what's available in $\frac{3}{4}"$ plywood of the same species.

As shown at right, you can make your own plywood by laminating a slightly oversized sheet of $\frac{3}{4}"$ plywood to a substrate (contact adhesive or woodworker's glue will do it). Then, straighten the edges with a flush trimmer bit in your router.

Written by Bill Krueger with Jim Boelting and Jim Downing
Illustrations: Kim Downing, Mike Henry Photographs: John Hetherington, Hopkins Associates
Family room clutter got you down? Here's one great looking solution. Corral all your home electronics gear into our full-service walnut entertainment center, which allows ample room for a videocassette recorder, a 27" TV (or smaller), a sound system, and loads of tapes, discs, and related items. We've also placed the television on a lazy Susan for perfect viewing from several angles.

**Cut the parts for the basic cabinet**

1. Using the sizes listed in the Bill of Materials and the Part View drawing for dimensions, cut the cabinet end panels (A), top and bottom (B), and dividers (C) to size from 3/4" plywood (we used walnut). To minimize waste, follow our Cutting Diagram.

2. From solid stock, cut the end panel caps (D) to size.

3. Cut a 1/4" slot 1/2" deep along the top edge of each end panel and the bottom edge of each panel cap where shown in the Spline detail accompanying the Basic Cabinet drawing. (As shown at right, we did this on a tablesaw fitted with a tall auxiliary fence. We also used a feather board to keep the panel firmly against the auxiliary fence.)

4. From 3/4" stock (we used plywood), cut a pair of 13/16"x18"-long splines. Apply glue, insert the splines in the panel slots, and add the slotted panel caps. Align the panel cap ends with the end panels and clamp.

5. Mark the locations, and cut or rout the dadoes and rabbets in the basic cabinet parts (A/D, B) where shown on the Basic Cabinet drawing. To keep the best grain visible (best side of the plywood), cut the dadoes in the surface opposite the face side. For the bottom piece (B), cut the dadoes in the face side.

6. Cut the cabinet support pieces (E, F, G) to size from 3/4" walnut plywood. Mark the layout, and cut a notch along the bottom of each part E where shown on the Basic Cabinet drawing.

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**Bill of Materials**

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*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

**Material Key:** WP—walnut plywood, W—walnut.

**Supplies:** 1 1/4" x 17 brads, #6 x 3/4" flathead wood screws, #8 x 1 1/2" flathead wood screws, shelf supports, finish.
Cutting Diagram

3/4 x 48 x 96" Walnut Plywood

3/4 x 91/4 x 96" Walnut

3/4 x 71/4 x 96" Walnut

*Resaw or plane to 1/4" thick

3/4 x 48 x 48" Walnut Plywood
Now, let's assemble the basic cabinet

1. Glue and clamp the end panel assemblies (A/D) to the bottom (B). Check for square, and use corner braces where shown in the drawing below. Drill and countersink four mounting holes through each cabinet side (A) and into the ends of the cabinet bottom. Drive the screws.

2. Glue and clamp (no nails) the front support pieces (F, G) to the bottom panel. Glue and nail the supports (E) to the bottom side of the bottom (B) directly under the 3/4" dados.

3. Glue and clamp the dividers (C) and top (B) to the assembly. Check for square.

4. Cut the trim support pieces (H, I, J, K) to the sizes listed in the Bill of Materials. (Before cutting the parts, we measured the opening to verify the lengths.)

Add the base molding

1. Cut the base molding pieces (L, M) to width and to length plus 2" from 3/4" walnut stock. See the Trim Assembly drawing. Cut a piece of walnut to 3 3/4" wide by 12" long; later, you'll cut two N's from this piece. Next, cut the front base trim piece (O) to size plus 2" in length.

2. Rout or bevel-rip a 1/4" chamfer along the top edge of each base molding piece. See the Base Molding detail for reference.

3. Trim the back edge square, and miter-cut the front end of each side trim piece (L) to length. Glue and clamp the trim pieces to the base. Continue to measure, miter-cut, and glue and clamp the remaining base trim pieces (M, N, O) to the cabinet assembly.

Add the front, side, and top trim pieces

1. From 1/4"-thick walnut (we resawed thicker stock), cut and miter-cut the front trim pieces (P, Q, R) to size and length. Glue and clamp the pieces to the front of the cabinet assembly where shown on the Trim Assembly drawing on the previous page.

2. Cut the vertical trim pieces (S, T, U) to size. Add them to the cabinet, and sand smooth.

3. Cut the top trim pieces (V, W, X, Y, Z) to size. Glue and clamp them to the top of the cabinet, and sand smooth.

4. Rout a 3/8" chamfer along the front and side edges of the trimmed cabinet top. See the Top Trim detail accompanying the Trim Assembly drawing for reference. Using a sharp chisel, form a chamfer on the inside edge where parts X and Y meet.

And now for the shelves, back, and finish

1. Cut the shelves (AA) and shelf fronts (BB) to size. Glue and clamp the fronts to the shelves with the tops and ends flush.

2. Cut, rout, or sand an 1/8" chamfer along the top front edge of each walnut shelf front.

3. Cut a strip of stock 6 x 22" long. Mark a centerline, and drill 3/4" holes where dimensioned on the Shelf-Hole Template drawing. Mark a B on the bottom end; this will prevent you from inadvertently flopping it end for end.
4 Using the shelf-hole template, drill the ⅛" shelf-clip holes ¾" deep. (We used a stop on the drill bit to prevent drilling through the cabinet sides.)
5 Position the cabinet facedown on a blanket. Viewing the drawing at left, rout a ⅛" rabbet ¼" deep around the inside edge of each of the end-cabinet openings where shown on the drawing.
6 Measure the routed openings, and cut the two back pieces (CC) to size. Round the corners of each back piece to fit the corners of the routed openings.
7 Drill access holes through the dividers for the electrical wires for your components (we used a Forstner bit). Back the plywood with scrap stock when drilling the holes to prevent chip-out.
8 Finish-sand the cabinet and shelves. Apply the finish.

Add the turntable shelf
Note: The TV turntable shelf shown was dimensioned to fit our particular television. Determine the size you'll need by referring to instructions on the TV Turntable drawing at left.
1 Cut the turntable shelves (DD) and front trim piece (EE) to size.
2 Glue the shelves face-to-face with the edges and ends flush. Trim or joint the front edge even, and glue the shelf front (EE) to it. Rout a ¼" chamfer along the top front edge of the shelf.
3 Sand and finish the assembled shelf. Fasten a 12" lazy Susan to the shelf and then to the cabinet bottom piece (B)—see the Buying Guide for our source.

Buying Guide
- 12" lazy Susan. Ball-bearing system, mounting instructions included, catalog no. 77520, $8.50 ppd. ($11 U.S. funds for Canadian orders). Armor Products, Box 445, East Northport, NY 11731. Or, call 800/292-8296 to order. •

Produced by Marlen Krommet
Project Design: Gregory A. Henderson
Photographs: Hopkins Associates,
John Hetherington
Illustrations: Kim Downing; Bill Zaan

WOOD MAGAZINE  OCTOBER 1991
OH MY, WHAT A CONTEST!

Each workday preceding the entry deadline seemed like Christmas morning here at WOOD® magazine. As toys arrived for our third Build-A-Toy competition, we unwrapped, admired, inspected, tagged, and yes, even played with them! Thanks to you warmhearted readers, underprivileged children across the nation will have the same opportunity come the holidays. As always, the U.S. Marine Corps Reserve will distribute 1991 entries through their Toys-for-Tots program.

Showcased here are the grand- and first-prize winners. For the complete winners list, turn to page 82. (All told, about one of every eight entrants earned a prize!) Although press deadlines prevent us from sharing winning plans with you in this issue, you will find the plans for an entrant's whimsical seaplane on page 58.

First prize, home hobbyist, went to Richard Zichos, Pasadena, Md., for his maple and walnut train.

One of last year's top winners, Neal Seely, Rochester, N.Y., captured first place, professional, with a puppy pull toy.

Build-A-Toy veteran Mike Jagiello, of Almond, Wis., snatched the grand prize, professional, with this lovable ladybug pull toy.

Build-A-Toy judges examined more than 400 Armor Products, East Northport, N.Y.; Barry
In the student division, Josh Escobedo, of Pioche, Nev., won the grand prize with his car transport.

Among home hobbyists, Larry Weaver, of Petersburg, W. Va., claimed the grand prize with his space shuttle.

A monster truck of solid padouk by John Hicks, Westlake Village, Calif., took student first prize.


Photographs: John Hetherington
In hopes of making some young child happy, David Lanford, from Pipe Creek, Texas, entered this simple beauty in our 1991 Build-A-Toy contest. We like the floatplane because you can quickly cut the pieces to shape, and then fit them together like a puzzle. We also have designated this as the Student Special-Entry Project in our 1992 Contest. See the complete rules on page 84.

1. Using a photocopy and spray adhesive or carbon paper, transfer the full-sized patterns on the opposite page to ¼" plywood. (We chose Baltic birch because it's strong, smooth, and lacks voids.)
2. Check the thickness of your stock against the width of the marked notches (¼" plywood doesn't always measure exactly ¼" thick). Adjust the notch size if necessary for a snug fit, and cut the pieces to shape.
3. Drill a ¼" hole through the center of the propeller.
4. Sand the pieces smooth (we progressed to 220-grit sandpaper), prime the pieces, mask off the mating surfaces for a good glue joint later, and then paint as desired. (We covered the mating surfaces with masking tape, sealed the plywood with two coats of aerosol lacquer, primed the pieces with white paint, and then used enamel modeling paints for the stripes. To form the straight lines, we used masking tape and painted one color at a time.)
5. Remove the masking tape, glue the parts together, and hold the propeller brad in the fuselage with instant glue. Don't use an accelerator with the instant glue; it will dissolve some paints.

Project Design: David Lanford
Photographer: Hopkins Associates
Illustrations: Kim Downing; Bill Zaun
When a woodworking project calls for a dado, you can go about cutting this square channel in one of several ways. For example, you can spend as little as $10 for a straight router bit, or more than $300 for a top-of-the-line dado-blade set. Sounds like a simple decision, right?

Not really. As we discovered in our tests of 30 dado blades, blade sets, and router bits, the type and size of your project, and the materials you use, are as important as cost in selecting a dado tool.

To put these dado-cutting tools to the test, we made cross-grain and with-grain cuts in oak plywood, solid oak, melamine-coated particleboard, and pine. We assigned a performance grade to every product for each type of cut, and compiled the results in the easy-to-read charts on pages 64 and 65.

Your options in dado-cutting tools
For this article we tested three types of dado blades sets and four types of router bits. We found that router bits of the same type tended to perform about equally from manufacturer to manufacturer. So, we limited our testing to the four types of bits shown below.

<table>
<thead>
<tr>
<th>ROUTER BITS THAT YIELD FLAT-BOTTOMED DADOES</th>
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<tr>
<td>Carbide-tipped mortising bit</td>
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WOOD MAGAZINE OCTOBER 1991
Blades and blade sets were a different story, though. We came across big performance differences from model to model of the same type. We tested assemblies ranging from 6" to 8" in diameter. (A few manufacturers provide 10" dado blades, but they're too large and heavy for 10" tablesaws.)

Manufacturers told us they sell more 8" models than any other size because they have greater cutting capacity than 6" products while not costing much more. For example, Freud's 8" model SD308 dado set sells for about $115, but the 6" version of the same product sells for only about 58 less.

These products will cut dadoes ranging from 1/4" to 3/4" wide. Here's a look at the different types of dado blades and blade sets:

**Stackable set.** As shown below, most of these products consist of two 1/4"-kerf outside blades for cleanly shearing the walls of the dado, and four or five chippers for removing the stock between the outside blades. These chippers come in various widths (1/8", 3/32", and 1/16") for cuts in 1/16" increments. For in-between sizes, you add shims (thin paper or metal discs) between the chippers.

As shown in the photo **bottom left,** most carbide-tipped chippers have two teeth, but two premium sets—the Forrest Dado King and the Systimatic Super Fine—have chippers with four and six teeth respectively. The extra teeth result in smoother dado bottoms and less "hammering" of the blade against the stock.

**Twin-blade adjustable.** To adjust the cutting width of this product, you simply turn a wedge mechanism at its hub. As shown in the drawing **below,** the two blades form a wedge themselves. The teeth at the point of the "wedge" clean out the middle of the dado, while the outermost teeth marked "L" and "R" in the drawing cut the left and right walls.

**Stackable set**

Most chippers have two carbide teeth, but Forrest and Systimatic make four-and six-toothed chippers, respectively.

**Twin-blade adjustable**

**Single-blade adjustable.** These tools, often referred to as "wobbler" have two round wedges on each side of the blade that you rotate to adjust the width of cut. As you can see in the drawing **above right,** the wedges angle the blade for various cutting widths.

Contrary to its nickname, this blade doesn't actually wobble from side to side. As shown **above,** one tooth (marked "L") stays along the left wall of the dado, and the tooth on the opposite side of the blade (marked "R") stays along the right wall. The other teeth also stay in orbits perpendicular to the saw arbor while cleaning out the dado.

**Which do you need: dado blade, blade set, or router bit?**

As a group, router bits have several advantages (besides just lower price) over dado blades and sets:

- Router bits cut smooth, chip-free, square, flat-bottomed dadoes in nearly any material (something that only dado sets costing $100 and up can do).
- You can't top the portability of a hand-held router when dealing with large, cumbersome workpieces (such as sheet goods).

Continued
When cutting stopped dadoes, router bits make the job as easy and safe as possible. A stopped dado made with a router bit requires less cleanup than one cut with a blade or blade set.

You can have a router bit sharpened for less than $5, but sharpening a stackable dado set will likely cost $25–$55.

Despite these merits, dado blades/sets still hold a special place in the hearts of most woodworkers for these reasons:

- Blade-based systems cut faster than router bits, and enable you to cut the dado in a single pass. A router often requires you to make multiple passes to achieve the necessary depth or width of cut. The more passes you make, the greater your chances of error.
- Most dado blades and sets will last a lifetime. Few router bits will do the same.

How we graded the tools
As you can see by the charts on page 64, we ran the dado accessories through a variety of materials, using a tablesaw, radial-arm saw, and router. For each cut, we assigned superior, excellent, good, fair, or poor ratings.

As shown in the photo below left, lesser-quality dado blades and sets have a tendency to chip laminates such as oak-veneered plywood (especially when cutting across the face grain). Some router bits handle laminates with ease, but a few leave fuzzy edges in softwood as shown bottom right. (In most instances, you can quickly sand away this fuzz.)

For cabinetry and furniture projects, look for tools that produce good-or-better cuts in the material you work with. For construction-type projects such as utility shelving, decks, or fencing, products with “fair” and “poor” ratings may meet your needs.

Note: If you already own a dado set that leaves a rough bottom, see page 31 for a product that offers you a solution.

In the column “Outside-blade tooth design,” we list which of the six tooth designs shown below you’ll find on the outside cutters of the stackable sets. The cutters with raker teeth produced a flatter bottom near the walls of the dado. We like the blades with No. 3-designed teeth because they leave only small scoring lines in the bottom corners of the dado.

These sets come with left and right outside blades, which must be kept in the correct orientation.

Both of the steel, hollow-ground sets we tested—the Sears 32177 and Vermont American 26747—left a tiny ridge when cutting a 1/4"-wide dado (no chippers).
How to get the most from your dado blades and sets

At the start of our testing, we were astonished at the chipping and splintering produced by even the finest dado assemblies when mounted in a tablesaw. Obviously, our saw was contributing to the problem, and that's where we looked for solutions. By the time we were finished, our results had improved 100 percent.

First, we added zero-clearance table inserts to the tablesaw. (See page 44 for instructions on making these helpers). This addition alone improved our results by at least 40 percent. The reason: the insert acts as a chip breaker that helps the blade cleanly shear the wood fibers.

Then, with dial calipers we adjusted the rip fence parallel to within .001" to the dado blade and blade sets. Voilà! Our cuts improved another 40 percent. Of course, nobody wants to take the time to make such fine adjustments for every dado cut, so we wondered just how accurately a fence must be set. Through a series of tests, we determined that a fence can be misaligned up to 1/8" from front to rear and still produce superior results (with a superior blade).

The simple method shown at right will help you attain this level of accuracy. First, cut a block of wood to a width equal to the desired fence-to-dado distance. With the dado blade or set raised fully, place the block where shown in Step 1 and set the fence at this distance. Then, rotate the same tooth toward you as shown in Step 2 and use the block to check the fence for parallel. (With adjustable blades, be sure to use the outermost tooth.)

We improved our dados the final 20 percent by installing turned-metal pulleys and a link belt on our contractor's-style tablesaw. These products, shown in the photo below, reduced the machine's vibration in two ways: 1) the turned-metal pulleys are better balanced than the cast pulleys that come standard with most saws, and 2) link belts run much smoother than conventional drive belts. You can interconnect the belt links to form a belt of any size in 1/8" increments. To purchase these products for most contractor's-style saws, see the Buying Guide on page 65.

Should you spend the big bucks for a good stackable-blade set?

If you intend to do cabinetry, furniture, and other projects that demand good-quality dadoses, then it pays to invest in a carbide-tipped, stackable dado set. Even the best adjustable dado blades do not produce good-or-better cuts in all materials. Although $100 or more may seem like a big investment for a saw accessory, keep in mind that such a set will give you a lifetime of service. And, with some hardwood plywoods costing $100 or more per sheet, a high-quality blade will quickly pay for itself if it saves just one or two panels.

Following are purchase recommendations in four price ranges. We based these guidelines on the assumption that you cut dadoses in a wide variety of materials. But, if you tend to make one type of cut in a specific material—say cross-grain cuts in oak plywood with a radial-arm saw—then look in the chart for the least expensive blade that gives good or better results under those circumstances.

● **Over $150:** All of the products in this price range cut like a dream and should satisfy even the fussiest woodworkers. But, only the Forrest Dado King earned "superior" ratings in every category. The set from Woodworker's Supply (made by FS Tool) might be a better value—if you can live with "excellent" crosscuts in solid stock and plywood.

Continued
TIP: When having a $100-and-above dado set sharpened, ask the sharpener if he grinds to 400-grit or finer. Grinding such a set to only 180-grit or so will not restore the blade's original ability to cut smooth dadoes.

• $100-$150: The Freud SD308 yielded superior and excellent cuts throughout; mail-order outlets offer this product for about $115. The Amana 658030 and the Delta 35-560 earned similar marks and will meet the needs of most any woodworking situation.

• $50-$100: The Sears No. 32708 Excalibur twin-blade dado model ($76.47) produced good-or-better cuts in every material except pine and melamine-coated particleboard. In this price range and below, none of the blades produced perfectly flat bottoms, but the Excalibur comes close.

• Under $50: Here, we found only one blade that meets the needs of most home woodworkers: the Irwin 16120. This product had beffier construction than the other "wobble" blades, and produced the squarest dado of any blade in this price range. The same product used to be sold under the Accu-Edge name.

Which type of router bit works best?

If a router bit is what you need, try a downward-spiraled, solid-carbide bit such as the Freud No. 76-106 we tested. Because its flutes cleanly shear the wood downward, it creates little chipping or fuzzing along the dado edge. However, remember that this bit does not work well for mortises (a task the upward-spiraled version excels at).

If you want to spend a little less, buy carbide-tipped straight bits that will handle most jobs. In our tests, the versions with shorter cutters—about $3/4"—produced the smoothest cuts.
**Buying Guide**

- Turned-metal pulleys and link belt. Two pulleys and 4' of link belt, $34.95 ppd. ($19.95 ppd. for the belt and $15 ppd. for the pulleys if purchased separately). Specify tablesaw model. In-line Industries, 661 S. Main St., Webster, MA 01570. Call 800/533-6709 or 508/949-2968.

**Manufacturers’ listing:**

- **Amana** 800/445-0077 or 516/752-1300
- **Credo** 503/982-0100
- **DML** 800/233-7297 or 502/587-5562
- **Delta** 800/438-2486 or 412/963-1100
- **Forrest** 800/733-7111 or 201/473-5236
- **Freud** 800/334-4107 or 919/434-3171
- **Irvin** 513/382-3811
- **MLCS** 800/533-9298 or 215/886-5986
- **Oldham/US Saw** 800/828-9000 or 716/778-9588
- **Sears** Call your nearest store
- **SystiMatic** 800/426-0000 or 206/823-6200
- **Vermont American** 704/735-7464
- **Woodhaven** 800/344-6557 or 319/391-2386
- **Woodworker’s Supply** 800/645-9292 or 505/821-0578

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**Footnotes for charts**

1. **S** Superior - No imperfections.
   - Excellent - Some sandable fuzz on shoulders of dado; no chips on stock surface.
   - Good - Some sandable fuzz on shoulders of dado; minor chipping on stock surface.

2. **E** Superior - Flat, smooth bottom that’s square to the walls.
   - Excellent - Flat bottom with slight roughness.
   - Good - Minor ridges.
   - Fair - Uneven bottom with large ridges.
   - Poor - Concave-shaped bottom.

3. See drawing on page 62.

4. (C) Canada
   - (J) Japan
   - (IS) Israel
   - (IT) Italy
   - (US) United States

5. Selling prices based on advertisements, catalogs, and dealer inquiries at time of article’s writing.

6. (C) Carbide, downward-spiral bit.
   - (Q) Solid-carbide, spiral bit.
   - (M) Carbide-tipped mortising bit.
   - (S) Carbide-tippedstraignt bit.

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**Written by Bill Krier**

**Product testing: Bob McFarlin**

**Illustrations: Kim Downing, Bill Zaan**

**Photographs: John Hetherington**
Last winter, I took my daughters Sasha and Chelsy, pictured above, to a sporting-goods store to pick out a toboggan. But after seeing the poor quality of available sleds, I got together with our project designer, Jim Downing, to design and build our own. The result—a sleek bentwood toboggan that really flies. Build yours now, and be ready to enjoy it by the first snow.

Marlen Kemmet
Marlen Kemmet, How-to Editor
TOBOGGAN

Note: You’ll need some ⅛”-thick ash strips for the curved portion of each runner. We resawed our own stock. See our resaw jig on page 80 for the method we used to cut our own thin stock.

We recommend slow-set epoxy for laminating the runners. If you’re unfamiliar with how to work with this type of adhesive, see the article on page 71 for details. And, for added seat comfort, consider buying the cushioned pad shown. See the Buying Guide at the end of the article for our source of these two items.

Build the form to laminate the runners
1 From ¾” particleboard or plywood, construct a form and base like the ones dimensioned on the Runner Lamination Form drawing at right. Use the Form Top View drawing, bottom right, for dimensions when cutting the curved form pieces to shape. (To form the curved pieces, we cut three pieces of ¾” particleboard to 12 × 24”, and glued them together face-to-face. Later, we marked the layout lines, cut the form to shape, and sanded the cut edges.)
2 Drill mounting holes through the base and into the bottom surface of the form. Glue and screw the form to the base.

Cut the pieces for the runners
1 From ⅛”-thick straight-grained ash, cut seven runners to 2¼” wide by 75½” long. Now, plane four of the runners (B) to ⅛” thick. Leave the remaining runners (A) at 1/2” thick.
2 Mount a dado blade to your radial-arm saw or tablesaw. Next, cut a set of three stepped 1½” dadoes to the depths shown across one end of each thick runner (A),
using the Runner Joints drawing at right and the photo below for reference. Cut just two dadoes across one end of the four thinner runners (B) to the size shown. Use a stop for consistent lengths.

3 To form the runner strips (C), use straight-grained ash, and rip 52 strips (this includes four extra strips in case of breakage) \( \frac{1}{8} \)" thick by 2\( \frac{1}{4} \)" wide by 38" long.

Using a stop for consistent lengths, cut the rabbets for the stepped-scarf joint in the ends of the straight runner pieces.

(We cut 3/4"-thick straight-grained ash to 2\( \frac{1}{4} \)"×38". Then, we used the resaw jig shown on page 80 and a thin-kerf blade to resaw our own 1/8"-thick strips from the 3/4"×2\( \frac{1}{4} \)"×38" pieces of stock.)

**Laminate the curved fronts**

1 Prepare the form for laminating by coating with paraffin wax the surfaces that will be in contact with the runner strips. The wax prevents any epoxy that accidentally leaks through tears in the waxed paper from bonding to the particleboard form.

2 Cover the form with waxed paper to further prevent the strips from sticking (see the photo at right for reference). Then, cut a dozen 1×2×2\( \frac{1}{4} \)" and one 1×2\( \frac{1}{4} \)×6" clamp blocks to size.

3 Clamp a runner piece (A) to the form so that the dadoed end is flush with the alignment reference mark and facing out.

Epoxy and clamp the thin ash strips to the straight rabbeted runner and then around the laminated form to create the bent front of the toboggan.

Continued
EXPLODED VIEW

Bill of Materials

<table>
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<th>Part</th>
<th>Finished Size*</th>
<th>Matl</th>
<th>Qty</th>
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<tr>
<td>A</td>
<td>¾&quot; x 2½&quot; x 75½&quot;</td>
<td>A</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>¾&quot; x 2½&quot; x 75½&quot;</td>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>¾&quot; x 2½&quot; x 40&quot;</td>
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<td>H</td>
<td>¾&quot; x 1½&quot; x 16½&quot;</td>
<td>A</td>
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*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: A-ash.

Supplies: #6 x ¾" F.H. brass wood screws, #8 x 1" flathead brass wood screws, #10 x 1¼" flathead brass wood screws, #10 brass finishing (countersunk) washers, #10 brass flat washers, #10 brass acorn nuts, 23' of ½" braided polypropylene rope, finish.

Note: D and E sit ½" in from edge of runners on both sides.

SIDE VIEW DETAIL

#6 x ¾" F.H. brass wood screw (2 per runner)

CLEAT DETAIL

#8 x 1" F.H. brass wood screw

Sand a slight round-over

©1991 WOOD Magazine
4 Spread epoxy on the mating surfaces of eight of the thin strips (C). Position and clamp the thin strips to the dadoed end of runner (A) to form what professional woodworkers call a “stepped-scarf joint,” as shown in the photo on page 68. Keep the edges flush, and use the clamp blocks to prevent marring the runners with the clamps. Let the laminate sit overnight for the epoxy to set up.

5 Before removing the clamps, cut the top curbed end of the runner to length with a backsaw, using the cut-off slot in the runner laminate form. Now, remove the clamps and repeat this process to make the two remaining thick runners and the four thin runners.

6 Scrape the squeeze-out from the edges of each runner. Sand the runner surfaces and edges smooth, making a slight round-over on the edges of each runner where shown on the Cleat detail.

**Machine the cleats**
1 Cut the cleats (D, E, F) and cap rail parts (G, H) to the sizes listed in the Bill of Materials.

2 With the ends and outside edge flush, glue and clamp the cap rail part G to part H. Later, scrape off the excess epoxy.

3 Mount a 3/8" round-over bit to your table-mounted router, and rout round-overs along the edges of each cleat where shown on the drawing above. Position the runners side by side on the workbench top, flush the curved ends, and clamp the curved front portion of the runners together with two pieces of straight stock where shown in the drawing above.

**Note:** For the toboggan to ride straight, make sure that you use the thicker runners (A) on the outside and center.

4 Position the back ends flush against the straight stock. If they're not flush, mark a line across the ends, and use a fine-toothed saw to trim them flush.

5 Next, drill countersink holes through the bottom of the runners and into the cleat to the sizes shown on the drawing. Be careful not to drill through the cleats (we used a depth stop on our drill bit.)

6 Place a drop of epoxy in each screw hole, and fasten the rear cleat to the runners with brass wood screws where shown on the Exploded View drawing and accompanying details. The epoxy keeps the screws from working loose over time.

7 Repeat the drilling, epoxying, and screwing process until all the cleats have been firmly attached.

8 To further strengthen the stepped-scarf joint, drill and countersink a pair of screw holes through each joint where shown on the Runner Joints drawing and the Side View detail accompanying the Exploded View drawing. Place a drop of epoxy in each hole, and drive the screws.

**Buying Guide**
- **Tropical hardwood epoxy.** Slow-set epoxy, one 16-oz. can of resin, one 16-oz. can of hardener, and instructions. $27 ppd. Smith & Co., 5100 Channel Ave., Richmond, CA 94804. Or, call 800/234-0330 to order.
- **Seat pad.** 1" foam covered with 131/2" X 64" vinyl, 10 grommets, $22.95 ppd. Sleecpond 4412 NE 14 St., Des Moines, IA 50313. By Marlen Kemper
- **Project Design:** James R. Downing
- **Photographs:** John Hetherington
- **Illustrations:** Kim Downing, Mike Henry

Produced by Marlen Kemper

WOOD MAGAZINE  OCTOBER 1991
A FAST TAKE ON
SLOW-SET
EPOXY

More forgiving than its quick-set cousins, this tough-guy glue stands up to the elements. So when you're building a project requiring moisture-proof, high-strength bonding and weather resistance, it's the only glue.

Slow-set versus quick-set
To use any type of epoxy, you first have to mix together its two parts: the resin and the hardener. With quick-set, or "five-minute," epoxy, you'll then only have a few minutes to mate up the pieces to be bonded. On the other hand, slow-set epoxy gives you an hour or more of open working time, and it takes up to 24 hours to cure completely.

Both slow-set and quick-set epoxies shrink very little as they cure. This makes both of them excellent gap fillers. Slow-set even lends itself to mixing with other material, such as colloidal silica, or fine sawdust to become a colored putty. And, both types can bond dissimilar materials.

For fast, on-the-spot repairs that don't require water resistance, count on quick-set epoxy to get the job done. Boat builders, though, favor slow-set epoxy because of its water resistance. We chose it for use on our toboggan project on the previous five pages because the wood, along with all glue joints, will be exposed to plenty of moisture from melting snow and ice.

Slow-set epoxy also rates slightly stronger than the quick-set type. However, the proper mix of resin and hardener is the key to successful gluing. Most slow-set epoxies require a one-to-one mixing ratio. Some, however, call for up to five parts resin to one part hardener. So, carefully follow the manufacturer's directions.

Minimal heat shrinkage
Epoxy also shrinks very little during curing because the exothermic (heat-producing) polymerization (combining of molecules) continues until all possible chemical bonding has occurred. That's why epoxy's heat-producing curing process can be a hindrance or a help. As a help, cool shop conditions (below about 60 degrees) slows curing for more working time. But warming the epoxy, say with a portable hair dryer, speeds it up for a faster bonding time.

When you mix and apply epoxy, be sure to wear disposable vinyl gloves. And beware—some people when they touch epoxy encounter an allergic reaction that irritates the skin.

Dispense the required amounts of resin and hardener in a disposable paper or plastic cup (for large amounts, you can use a metal can). Because epoxy creates heat, you shouldn't mix it in an insulated foam cup—it'll melt.

Remember to mix only what you need or can apply in a reasonable amount of time. Then, with a stick or plastic paddle, stir the parts thoroughly.

For best results, apply the epoxy evenly to both mating surfaces with a brush, spatula, or roller. Join small, intricate items with a syringe.

You'll need less clamping pressure on material joined with epoxy than you would with other adhesives. Light and even pressure does the job. In fact, over-clamping squeezes out the epoxy, leading to a weak, glue-starved joint. Use wax paper or paste wax to protect surfaces that you don't intend to glue. And, using a solvent, such as acetone or vinegar, clean off all epoxy that squeezes out before it sets. Cured, epoxy proves nearly impossible to remove from a surface.

Illustration: Jim Stevenson
Fine woodturning and gourmet cookery come together in this unusual design. When you're done at the lathe, turn out some noodles with the recipe on page 88 provided by our friends at the Better Homes & Gardens® Test Kitchen.

We used these tools and supplies
3 x 3 x 18" turning square of hard maple, yellow birch, or other close-grained hardwood; lathe; centers; 3/8" parting tool; 1/4" gouge; 3/8" gouge; 1/2" gouge (optional); outside calipers; tape measure; straightedge.

Lathe Speeds
Roughing: 800-1200 rpm
Sanding: 1300-2000 rpm
Finish cutting: 1200-1800 rpm

Note: Turning the noodle cutter's smooth and cutting edges requires careful, consistent tool control. Practice those cuts on scrap material before beginning the project.

First things first
Mount the turning square between centers, and round it down to 2 3/4" diameter with the 3/8" or 1/2" gouge. Gauge the diameter at the ends and several points along the length with calipers.

Lay out the turning on your rounded blank with a sharp pencil. Starting at the headstock end, leave 5/8" for waste. From there, mark consecutively a 2" section for the ball end of the handle, 1" for the handle cone, 11" for the main coved body, another 1" handle cone, and another 2" ball end. The remaining portion at the tailstock end will be waste. (See Full-Sized Half Pattern, opposite page, for reference.)

With the 1/8" parting tool, cut 3/8" deep on the outside and inside of each ball end, leaving a full 2"
width for the ball. Next, taper the areas from each end of the 11" center section toward the ball. Now, turn the center section to 2½" diameter. Check the surface for unevenness with a steel straightedge, and gauge the diameter at the ends with calipers to insure that the cylinder is true.

Sand the center section with 150-grit sandpaper, and then recheck with the straightedge. Complete the sanding with 220-grit and then 400-grit sandpaper.

**Now for the cutting edges**

Transfer the template from the Full-Sized Half Pattern, right, to posterboard, and cut it out with an X-acto knife. Now, on your turning, lay out marks 3½" on center along the 11" section, starting from the middle and working toward each end. With the lathe at a slow speed, about 800 rpm, draw a pencil line around the cylinder at each mark. These will be the noodle-cutting edges. (See the half-pattern for reference.)

Now, refer to the Cutting the Coves drawing, below, and cut ¼" deep midway between each pair of lines with the ¾" gouge. Next, widen each cove with two careful cuts, one from the pencil line on each side to the center of the cove. Start each cut at the pencil line, but be sure to leave the line.

Then, with a ¼" gouge and working from one end of the noodle cutter to the other, round out the coves to about ¾" deep. Maintain the symmetry and consistent shape of the coves by checking with the template.

With the lathe running, sand inside the coves with 150-grit sandpaper rolled into a tube. Follow with 220-grit. With the lathe stopped, lightly sand the cutting edges—just enough to ease the pencil lines—with 400-grit sandpaper. Be sure the cutters don’t come to a knife edge.

**Here’s how to turn the ball handles**

Part in to 2" diameter in the middle of each ball section, checking with calipers. Remove the waste on either side almost to the parting-cut depth. Cut in to about 1" deep on each side of each ball section. Now, form the ball ends with the ¾" gouge. Make room for the tool by cutting into the handle cone area and the waste areas on the ends of the turning.

Part in to ⅜" diameter at the point where the ball joins the cone, checking with calipers as you cut in. Sand the ball ends and cones with 150-grit sandpaper followed by 220-grit.

Cut the waste ends to ⅜" diameter. Shut off the lathe, and remove the turning with a coping saw. Sand the area to match the ball contour in graduating grits up to 400-grit sandpaper.

Finish the noodle cutter with a food-safe finish such as Livos Kaldet Resin and Oil Finish, or Behlen’s Salad Bowl Finish. 

---

**CUTTING THE COVES**

- Cut 1: ¾" gouge
- Cut 2: ⅜" gouge
- Cut 3: ⅜" gouge
- Cut 4: ¼" gouge

Final depth approx. ¾" to center

---

Design: Russ Hurt
Illustrations: Kim Downing; Mike Henry
Photograph: Hepkins Associates
Walnut-clad 
PUMP DISPENSER

A hands-down winner for lotion and soap

A handy pump dispenser for soap or hand lotion that's easy to build and looks great, too? Where else but The Craft Shop? Your reward for a little effort on this one: the perfect finishing touch for your kitchen or bathroom.

Note: You'll need ¼”-thick stock for this project (we used walnut). Plane thicker stock to size, or resaw the stock using our simple resawing jig on page 80.

From ¼”-thick stock, cut two 2¾” squares for the top and bottom, then bevel-rip eight pieces 1⅛” X 5¼” at 22½° for the sides.
Lay the sides, bevel down, next to each other on your workbench. Align the ends and tape the pieces together with masking tape or reinforced strapping tape. (See the Body Strips drawing.) Turn the assembly over, and roll it into an octagon, checking all joints for a tight fit.

Unroll the sides, then apply woodworker’s glue to the open joints. Roll up the sides again, making sure all joints are tight. Secure with tape until the glue sets.

Use a Forstner bit or hole-saw to bore a 1 1/8” hole in the center of one square. Back it with scrapwood to prevent tear-out. Then, using the body as a guide, cut the corners off both squares, leaving a margin on all sides.

Remove the pump assembly from the bottle, and slide the bottle into the body. Now, glue the top into place, locating the hole in the top over the bottle neck.

With a disc or belt sander, sand the edges of the top flush with the body sides. Then, sand 45° chamfers on the top edges. (We used a miter gauge for accuracy, but a guide block clamped to the sander table also would work.)

With the bottom held firmly to the body, mark and drill four 1/16” holes 3/8” deep through the bottom and into the body’s sides. Enlarge the holes in the bottom to 3/32”, and then countersink them.

Attach the bottom with four #2 x 1/2” flathead brass wood screws. Sand the bottom edges flush with the sides, and then remove the bottom. To keep the bottle from turning inside the body, glue it to the bottom with hotmelt adhesive.

Apply a clear, durable finish (we used a wipe-on polyurethane product), and then install the bottom. Now, you’re ready to fill the dispenser and pump your hand lotion in style.

**Buying Guide**

- **Bottle and dispenser.** Plastic bottle with screw-on pump-type dispenser. $4.98 for one set, or $6.50 for two sets, ppd in the United States. Include an index card or mailing label with your name and address typed or printed on it. Order from Ennis Mountain Woods, RFD 2, Box 222B, Afton, VA 22920.
NOAH'S LOVABLE

When family and friends see this great Noah's Ark and animals, they'll think you worked for 40 days and 40 nights. But thanks to our easy, pattern-packed plans, you can tell them it took less time to make than a rainy afternoon. Or, you could just keep 'em guessing!

You'll need these materials: Build the ark with a 1x6x4 pine board, a 12'' length of 2x4, and a 1/4'' dowel at least one inch long. You'll need 1/4'' stock for the gangplank and the animals. Plane or resaw thicker stock to size. We used several wood species for the animals as indicated on the patterns.

First, let's build the ark
Cut four pieces of 1x6 pine 12'' long. Now, make four photocopies of the full-sized hull quarter pattern on page 78. Scissor out the four sections, and then join them with cellophane tape to make a full-sized hull outline. Adhere the pattern to one of the hull pieces.

Next, tilt your bandsaw or scrollsaw table to 25°, and cut along the outside pattern line. Then, place the part you just cut with the narrow side down on top of another 1x6 piece. Trace the bottom outline as shown below, and cut. Make four layers total, tracing each from the previous layer.

Now, return to the top (largest) layer and saw along the inside pattern line, entering the interior cut at the midpoint of the left side. Do not cut inside the other hull layers.

Finally, set the bandsaw table to 0°, and cut the gangplank opening 13/8'' wide, as shown on the Exploded View drawing. Sand round-overs on the top and bottom edges of the hull layers (to create the grooved sides), apply glue, and clamp together. Once dry, drill a 1/4'' hole 1/4'' deep in each end where shown on the Exploded View drawing. Cut two pieces of 1/4'' dowel 1/2'' long, apply glue, and insert.

Note: Repeat process using bottom of each successive layer as template for the next. Cut all layers at 25°.
ARK
and a complement of friendly critters

Rip a 12" 2×4 to 2½". From this, cut a 5" length for the cabin, and a 6" length for the roof. Next, bore three 1"-diameter holes through the cabin piece where shown on the Exploded View drawing. Cut the window bottoms with the scroll saw. Adjust the bandsaw or scroll saw table to 45°, and bevel the sides and ends of the 6" length to make the roof.

Saw a ¾" stock to 1½×5½" for the gangplank. With a tablesaw, cut ¼"-deep blade kerfs ¼" wide, spaced ½" apart on one side.

Sand off saw marks, and sand slight round-overs on the cabin and roof corners. Stain the deck, cabin, and gangplank. Paint as shown in the photo, above right.

For an aged look, scuff the paint with sandpaper, sanding through to bare wood on some corners. Then, wipe with walnut stain. Now, glue together the hull, cabin, and roof.

And now, for the animals

Make two photocopies of each animal pattern, next page. For each, except the dove, cut three pieces of ¼"-thick stock to the dimensions shown on the pattern. Laminate matched sets temporarily with double-faced tape. Use small pieces of tape so you can easily separate the pieces later.

Our animals have a clear finish, but you could cut them from pine and paint them.

Adhere a pattern to its respective stack. Then, cut along the outermost line. Separate the three pieces. (If they don't come apart easily, dribble lacquer thinner into the joints to break the bond.)

Designate one piece the left side, one the right side, and one the center. Saw all legs off the center piece. Saw the head and tail from the left and right sides (but leave the tail on the crocodile's sides). Now, following the pattern lines, saw the extra legs off each side. Cut the elephant ears and tusks (we used pine for the tusks), and the lion ears. Cut the dove from a single thickness.

Assemble the animals, referring to the Animal Assembly detail. Round over the edges with sandpaper, and apply a clear finish. Finally, glue the dove to the roof of Noah's ark. ♦

Full-sized patterns on next page

Project Design: Harlequin Crafts; James R. Downing
Photograph: Hopkins Associates
Illustrations: Jamie Downing; Jim Stevenson

WOOD MAGAZINE  OCTOBER 1991  77
LETTER PERFECT KEY CHAINS
A great gift idea for friends from A to Z

That little plastic key chain from the insurance agent just isn't you, is it? Why not spend a few minutes with your scrollsaw, cutting your initial from laminated hardwoods? Then, make some more for gifts because everyone will want one.

Note: You'll need thin stock to laminate for this project. Plane thicker stock to size, or resaw it using our jig on page 80.

Cut your stock (see the drawing below for thicknesses) and glue up \( \frac{1}{4} \times 1 \frac{1}{2} \times 6 \) laminations. Photocopy or trace the letter you need from the full-sized alphabet running around this page.

Adhere the letter to your laminate with spray adhesive. Scrollsaw any interior openings first, drilling start holes as needed. Then, cut around the outline. Sand and apply a clear finish.

Remove the bottom ring from a keychain assembly (available from craft suppliers). Open a size 216½ brass screw eye from the hardware store, and then install it on the chain end. Drill a \( \frac{1}{16} \) hole \( \frac{1}{4} \) deep centered in the top edge of the letter. Coat the threads with epoxy, and insert the screw eye.

Illustrations: Jamie Downing; Jim Stevenson
Photograph: Hopkins Associates
SUREFIRE RESAW JIG

SAFELY AND CONSISTENTLY CUTTING IT THIN

Thin stock for projects like our toboggan (see page 66), can be hard to find, but you can resaw your own easily and safely with the jig featured here. Build it to fit your saw table, and you'll use it again and again.

Construct the base and fence to form the jig

The jig shown has two basic components: the base and the fence. For the base, start by making a zero-clearance insert (A) of solid wood to replace your saw's metal insert. (The top of the insert must rest flush with the top of the table surface.) Cut the base (B) to size. Lower the insert into place, and position one edge of the base approximately 5" from the blade where shown on the drawing. Clamp the base to the tablesaw.

Start the tablesaw and raise the rotating blade to its highest setting (this creates the kerf in the insert and base); then, shut off the saw. (We settled on a 24-tooth, carbide-tipped rip blade as the best for resawing.) Locate countersunk pilot holes for the screws shown safely away from the kerf, and screw the base to the insert. Using a straightedge and pencil, extend the lines of the kerf in both directions.

With a handsaw, cut between the lines just marked to lengthen the kerf enough to accept the splitter (this device keeps the kerf of freshly cut stock from pinching on the blade). Also...
drill a ¾" hole inside the marked lines on the base to accept the 1"-long removable dowel-guide pin. Cut the splitter (C) and guide pin (D) to size; epoxy the splitter in place.

To fabricate the fence, cut the horizontal support (E), upright (F), and the four support braces (G) to size. Locate and cut the 3½" slots. Form the rabbet at the bottom edge of the upright, and radius its top two corners. Glue and screw these parts together, checking that the base and the upright meet at a 90° angle.

Cut the upper splitter parts (H, I, J) to size. Notch the spacers (I). Drill and countersink a pair of holes through part H to align with the slots in the upright (F). Epoxy a pair of ¾"x2½" machine screws between parts H and J. Then, drill and countersink the mounting holes, and epoxy a pair of ¾"x2½" machine screws to the upper back end of the upright where shown on the Exploded View drawing. You’ll use this last pair of screws to form an easy-access storage rack for the spacers.

**Readying the jig for resawing**

Lightly clamp the jig to the tablesaw, and raise the blade about 1½" above the saw table. Using the appropriate number of spacers (in the case of the toboggan on pages 66, use one ⅛"-thick spacer), set the fence the desired distance from the blade as shown in the opening photo left. Use the spacer so that the fence is parallel with the front and back edges of the blade.

As shown in the intro photo, use a square to verify that the fence is perpendicular to the saw table. If you detect problems (be precise in your measurements!), loosen the C-clamps slightly and shim as necessary.

Insert the appropriate number of spacers between the upper splitter and fence (for the toboggan strips use just one ⅛" spacer). Then, set up a feather board and kicker arrangement like the one shown in Photo A.

With the feather board snugged up against the stock and the blade raised to make a 1" cut, run the material through the saw as shown in Photo B. (For case in cutting the toboggan runner strips, we raised the blade to 1¾" and cut the strips in two passes.) Flip the stock end for end, lower the upper splitter so that it captures the upper portion of the material. Run the stock through again (same face against the fence) as shown in the photo. The splitter prevents the blade from gouging the already-sawn portion of the stock as the remainder of the material passes the saw blade.

**Note:** For wider boards, it’s best to adopt a multiple-pass technique. Take a 1" bite from the material on the first two passes, and then raise the blade ½" each pass after that. After making one cut along each edge, put the guide pin in place. Sometimes, a kerf will close up immediately after passing over the blade; the pin will hold the kerf apart to prevent the kerf from binding on the blade. 🕵️

Project Design: James R. Downing
Photographs: Hopkins Associates
Illustrations: Kim Downing, Mike Henry

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WINNERS APLENTY IN THE 1991 BUILD-A-TOY CONTEST

From the best use of a router to the home hobbyist's top finish, here's the complete list.


Best train by a professional was claimed by Carl Boop, Levittown, Pa., for his old-time steam train.

STUDENT DIVISION
Grand Prize ($2,000 Kity K-5 machine): Josh Escobedo, Pioche, Nev.
First Prize ($1,500 Black & Decker merchandise): John Hicks, Westlake Village, Calif.
Third Prize ($500 merchandise, American Tool Cos.): Todd Journey, Newark, Ohio.
Fourth Prize ($250 merchandise, Industrial Abrasives; (tie) Michael Bishop and Tony Henry, Newark, Ohio.

HOME-HOBBYIST DIVISION
Grand Prize ($2,500 Delta merchandise): Larry J. Weaver, Petersburg, W. Va.
First Prize ($1,600 Shopsmith Mark V): Richard J. Zichos, Pasadena, Md.
Third Prize ($500 Lobo merchandise): Bob Hill, Oelwein, Iowa.

PROFESSIONAL DIVISION
Grand Prize ($2,000 Freud merchandise): Mike Jagielo, Almond, Wis.
First Prize ($1,000 AEG merchandise): Neil Seely, Rochester, N.Y.
Second Prize ($500 Skil merchandise): Steven A. Bruni, Fort Madison, Iowa.

Third Prize ($400 Wilke BW1-P planer): Daniel F. Sims, Pendergrass, Ga.
Fourth Prize ($348 Milwaukee electric 4" belt sander): Donald J. Polito, Hawthorne, Calif.

SPECIAL CITATIONS
BEST USE OF ROUTER
Student (ArmMax scroll): Casey Vos, Lewiston, Mont., train.
Home hobbyist ($1,000 Porter Cable merchandise): B.J. Dowler, Phoenix, Ariz., fire truck.
Professional ($1,000 Ryobi merchandise): Phillip Peck, Montague, Calif., push-button telephone.

BEST USE OF WOOD
Student (Turning squares, Adam's Wood Products; $100 Constantine's merchandise): Josh Escobedo, Pioche, Nev., car transport.
Home hobbyist (14" RRI scroll): Steve Roberts, Dunmore, Pa., road grader.
Professional ($500 Makita merchandise): Steve Roberts, of Dunmore, Pa., won best use of wood by a home hobbyist with his road grader.
Home hobbyist's best plane was this puzzle by Bruce Stevenson, Circle Pines, Minn.

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ARMOR, Box 445-E, East Northport, NY 11731
Going around in circles on your bandsaw
What's the secret for cutting a perfectly round circle in wood—something about 6"—on your bandsaw?
Do you always have to follow a line, and then sand? I'm making a carousel which requires cutting a 4"- and a 6"-round piece out of 1" stock. Thanks for any help.

—Henry R. Krygsbeld, Lansing, Ill.

Henry, do we have a jig for you! It consists simply of a piece of plywood scrap with a small nail sticking up through its center about ¼". In the bottom of the intended round cutout, drill a center hole the same diameter as the nail. Place the workpiece on the nail, and secure the plywood jig to the bandsaw table, making sure the distance between the center of the circle and blade equals your circle's radius. Now, using a ¼" blade, cut out the circle by rotating the workpiece. (See Drawing B) Note that we laid out our circle along the edge of the workpiece to create a starting place. After cutting, sand the edge smooth to remove splinters and saw marks.

If you want to cut perfect circles and don't care what machine you do it with, consider using a router and a trammel base like the one shown left. A straight bit works best for this operation. You can go with either a nail or dowel pin as the pivot point for the base piece.

Continued on page 86
WOOD® Magazine announces:
1992 BUILD-A-TOY™

Fourth Annual Contest to benefit children through Toys-for-Tots.

ENTRY DEADLINE: FEBRUARY 1, 1992
Great prizes for every skill level!
Prizes for Original Designs and Built from Plans!

We're proud to invite woodworkers of every age and skill level to participate in our Fourth Annual BUILD-A-TOY Contest.

Design prizes will be awarded for toys built from original plans. Several of these toys will be chosen for future editorial features in WOOD! Special Citation prizes are open to all woodworkers who send us a toy.

BUILD-A-TOY is the best way we know of for woodworkers to get the recognition they deserve for great craftsmanship. And the toys you submit will be contributed to the Toys-for-Tots program of the U.S. Marine Corps Reserve and distributed to underprivileged children this Christmas!

Enter our BUILD-A-TOY contest; help promote the wonderful craft of woodworking, win some terrific prizes, and make a child very happy this holiday season. Please join us!

COMPETITION PRIZES AND CATEGORIES

<table>
<thead>
<tr>
<th>STUDENT (K-12)</th>
<th>HOME HOBBYIST</th>
<th>PROFESSIONAL</th>
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<tbody>
<tr>
<td><strong>DESIGN PRIZES</strong>: These 12 categories are open to original designs only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grand Prize: Black &amp; Decker: $1,000 in merchandise</td>
<td>Delta: $2,500 in merchandise</td>
<td>AEG: $1,000 in merchandise</td>
</tr>
<tr>
<td>First Prize: Grizzly: $500 in merchandise</td>
<td>Shopsmith: Merk V ($1,600 value)</td>
<td>Porter Cable: $1,000 in merchandise</td>
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<tr>
<td>Second Prize: Skill: $500 in merchandise</td>
<td>Ryobi: $1,000 in merchandise</td>
<td>RBL: 16&quot; variable speed Scroll Saw ($750 value)</td>
</tr>
<tr>
<td>Third Prize: American Tool Co.: $500 in merchandise</td>
<td>Lobo: $500 in merchandise</td>
<td>Wilke: BW-8 Planer ($400 value)</td>
</tr>
</tbody>
</table>

SPECIAL CITATIONS: These 36 categories are open to both original and existing designs.

Best use of Wood: Adams Wood Products: Assortment of Turning Squares
Best Carved Toy: Dremel: $500 in merchandise
Best Finish: Delta: $1,000 in merchandise
Best Truck: Klockit: $100 in merchandise
Best Car: Constantine: $100 in merchandise
Best Pull Toy: DML-10: Carbide Tipped Blade
Best Train: Rodale: Woodworking Books
Best Bank: Klockit: $100 in merchandise
Best Airplane: Geneva Specialties: $100 in merchandise
Most Number of Toy Entries: Accurate Tool, Pore Gauge
Best Cradle: Geneva Specialties: $100 in merchandise
Best Puzzle: St. Croix Kits: Thumb Piano

STUDENT SPECIAL ENTRY PROJECT: This category is open to student woodworkers who build a toy plane from plans found on page 88.

Best Toy Plane: Woodworkers Book Club: $100 membership

HOME HOBBYIST/PROFESSIONAL PROJECT: This category is open to home hobbyists or professional woodworkers who build a toy from plans in WOOD magazine's new book, All-Time Best Toy Projects. See ad on inside back cover.


There is no limit to the number of entries. Please provide the following information for each toy submitted:

- My entry is [ ] Original design [ ] Built from plans
- My skill level is [ ] Student [ ] Home Hobbyist [ ] Professional

*For Original Design entries I certify that I have designed and built this toy myself. Should my entry win, I agree to cooperate with WOOD Magazine to supply builder's notes and a bill of materials for publication.

Name:
Address:
City State ZIP:
Phone:

Seed toys to: 1992 BUILD-A-TOY, WOOD Magazine, 1912 Grand Avenue, Des Moines, IA 50309-3579

Wanted: a slow glue for longer working time

Do you know of any good slow-drying wood glues? These new aliphatic resin glues dry too fast for large projects. In fact, they dry so fast that it's impossible to square the item when you assemble it.

If you don't believe me, just take two pieces of scrap pine, apply a thin coat on one, press the pieces together, and in less than three minutes you won't be able to pry the pieces apart.

Applying heavy coats works somewhat better, but you always end up with a mess, and hide glue is too thick for use with biscuit joints.

—Paul Ondras, South Windsor, Conn.

Safe finishes for wood toys

I'm looking for advice on locating nontoxic finishes (paints and stains) for wooden toys that I make for my children. Specifically, I'm seeking information on stains in primary colors that let the natural wood show through, and paints that produce bold bright colors.

Am I right that water-soluble aniline dyes bring out wood's natural beauty? Could you please supply brand names of the dyes and paints you prefer for children's toys? Thank you for your help.

—Cy Stokboff, Albuquerque, N.M.

Why wipe up stain?

Most staining instructions say wipe or brush on [the stain], wait a prescribed number of minutes, and then wipe off. Why does the stain have to be wiped off? And secondly, what's the difference between paint and primer?

—Rudy Nerat, Chula Vista, Calif.

Rudy, beginning with your first question, you need to remove any stain residue to create a color-even finish. Leaving extra stain could result in blotching. Keep in mind, also, that you can always reapply more stain for a deeper, darker look.

Turning to your second question, a primer is the first paint coat applied to a surface. It functions as a filler to cover up slight imperfections while guaranteeing a solid color finish and double protection against grain show-through. Sanded and wiped clean, it provides a terrific surface on which to apply a smooth finish coat.

You can buy paint sealers that serve strictly as primers, or use varnish or lacquers. With many woodworking projects, you can apply the same paint for the finish coat and the primer. Often, you'll want to thin the prime coat for best adhesion to the original surface.

Seeking software for furniture design

I would like to design my own furniture on computer. However, all the software drawing packages I'm familiar with do not draw or design furniture. Do you know of any specific woodworker's software suitable to this type of design work? I have an IBM PS/2 386 computer.

—Ken Haynes, Green River, Wyo.

Ken, we recently purchased a PC and compatible software for our design editor, Jim Downing, to do exactly what you seem to want. In his search for software, Jim found generalized CAD (computer-assisted design) drawing programs for use in designing anything from airplane cockpits to entire houses. He found nothing geared specifically to woodworking. In spite of this, he purchased DesignCAD 2-D and DesignCAD 3-D by American Small Business Computers, Inc. and says he's happy with the softwares' performance and drawing features. For more information, call 918/825-4844.

Continued on page 88
BACK ISSUE SALE

While supplies last, you can order the issues listed below. We will process orders on a first-come, first-serve basis, and when the magazines are gone, that’s it.

WOOD® magazine
#7 Surface sander, coffee table, hall shelf, magazine rack, doll furniture, classic radio, carving tools, resawing jig.
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#9 Dining table, clocks, jewelry box, multi-machine, Japanese hand tools, furniture stripping, seating standards.
#10 Parsons table, dining chair, lantern, ceiling fixture, wren house, airplane, air compressors, plastic laminates.
#12 Scrollsaw, breakfast tray, tie rack, tow truck, sandpaper storage, parrot magnets, bookends, power miter saw.
#13 Cedar chest, kid’s table and chairs, mug rack, kitchen cabinet standards, jewelry case, drum-sanding, planers.
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335 GREAT SHOP TIPS □
Those bleeding oil-based finishes
I finish all of my red oak projects using medium walnut Watco Danish Oil, being careful to follow all label instructions. My basement shop is both warm and dry. However, the oak continues to "bleed" drops of oil for several days after wiping it dry in accordance with the instructions. In fact, even when it appears dry after wiping with a cloth or towel, still more drips appear on the surface when I turn the wood over or stand it on end. I buy dried oak from a reputable dealer in the area. Needless to say, this wiping adds a great deal of time and effort on my part to complete a project. Do you have any ideas?

—Rob Carter, Lynnwood, Wash.

Sad over sap
For a hobby, I cut and make woodcraft projects. My problem lies in the discoloring that occurs from oozing sap after I finish my projects with acrylic paint and varnish. I use only pine. What can I do to seal the wood and prevent discoloring?

—Randy Berndt, Franklin, Mass.

Randy, you might try these two strategies to eliminate your problem. First, closely check the pine you buy to ensure that it's free of sap pockets or dark streaks where a concentration of sap may lurk. Then, before painting projects made from this wood, seal them with polyurethane varnish or lacquer to create a barrier between the paint and any leeching sap.

Drilling centered holes in wood balls
I have been making door harps using wood clapper balls and dowels, but I have a problem making the straight holes in the balls with my drill press. Is there some kind of jig I can make to help me out?

—L.J. Anderson, Wisconsin Rapids, Wis.

Yes, L.J., we have such a jig. (See left.) To make it, first clamp a block of wood to your drill-press table. Then, take a spade bit that's 1/8 to 1/16" less than the diameter of the wood ball you intend to drill, and bore a hole into the wood block. Next, change bits to the size of hole needed in the ball, insert the ball snugly in the hole just drilled, and bore into the ball to the desired diameter and depth.

NOODLES FOR YOUR CUTTER

If you've just completed the turned noodle cutter shown on page 72, you can try it out right away with this pasta recipe from the Test Kitchen at Better Homes & Gardens®.

Woodworker's choice pasta
2 1/2 cups all-purpose flour
1/2 teaspoon salt
2 beaten eggs
1/2 cup water
1 teaspoon cooking oil or olive oil

In a large mixing bowl, stir together 2 cups of the flour with the salt. Make a well in the center of the mixture. In another bowl, combine the eggs, water, and oil. Add to the flour mixture; mix them together thoroughly.

Sprinkle the kneading surface with the remaining flour, and turn the dough out onto it. Knead until smooth and elastic (8-10 minutes). Cover and let rest for 10 minutes.

Divide the dough into fourths. On a lightly floured surface, roll each fourth into a 12 x 12" square (about 1/2" thick). Let stand 20 minutes. Cut the pasta on a hard surface. Let it stand for 10 minutes, then separate the noodles.

Cook pasta 1 1/2 to 2 minutes. Drain well. Makes 1 lb. fresh pasta.

To store the pasta, separate the noodles and dry them overnight or until completely dry. Refrigerate in an air-tight container for up to 3 days. Or, dry the pasta at least 1 hour, seal in a freezer bag, and freeze for up to 8 months.
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Three classic but common Stanley Rule and Level Co. router planes.

Granny's tooth, grandfather's tooth, witch's tooth, or oldwoman's tooth—for centuries the router plane has carried the most colorful of nicknames. The names make sense, too, considering the way the cutting iron protrudes beneath the wood-block body. It conjures up the image of a lone incisor—a common sight before dental hygiene.

According to our dictionary, one definition of "rout" is to "dig up with the snout." And that kind of describes what the manufactured iron router planes pictured above do. The most common of those—the Stanley No. 71½, for instance—smooths and flattens the bottoms of grooves and dadoes cut by plow planes, saws, or chisels. The wide base makes it ideal for flattening bottoms of grooves too wide for a plow plane. You can adjust the cutter to reach into corners that most planes can't reach and to rout mortises. And, you can cut stopped mortises, such as those on stair stringers.

Despite its rather peculiar looks, the No. 71½ occupied a place in the toolboxes of most late-19th- and early-20th-century carpenters. Today, craftsmen still use it for smoothing dado cuts made with a tablesaw. If you want a No. 71½ in good condition, expect to pay about $30—half the cost of a new one from Stanley.

Turn-of-the-century carpenters favored the tiny No. 271, also pictured above, for routing small hinges, door-strike plate mortises, and for cleaning small grooves and dadoes. First made in 1926, today it's worth $10 to $20.

At $150 to $350, the more specialized No. 171 door-trim and router plane, pictured above, appeals primarily to collectors. Distinguished by its spring-loaded cutter mechanism, this fascinating tool routs door-hinge mortises with ease. Its cutter works down to a preset depth and then smooths the bottom. Manufactured from 1911 until 1935, it came with an adjustable fence and three interchangeable cutters. The blade turns in 90° increments, so you can pull it toward you with the handles perpendicular to the groove. Or, you can put the driving force at the heel of the tool, as you would other planes.

The motorized tool we now call a router also performs bottoming and mortise-cutting tasks, plus many others. Routers and router planes have similar base and handle configurations, and each has a cutter protruding from the base.©

Written with Philip Whitby
Photograph: Tim Murphy
IRONWOOD AROUND THE WORLD, IT'S TOUGH AS NAILS

In Ontario, New England, and the northern Great Lake states, there's a firewood so tough that it stalls hydraulic log splitters. Yet, it's worth the herculean effort necessary to build up a pile because it burns well through a cold winter's night. Ironwood, as it's called, has such complete combustion it leaves little ash.

Ironwood grows in Texas, too—and in Australia, Brazil, Ceylon, England, India, and other parts of the world as well. Wherever the wood appears, it attains legendary stature, taking claim to the titles of hardest and heaviest.

Despite the wood's reknown, however, ironwood isn't a specific species. Rather, it's a colloquial term for a state or region's toughest wood. All told, there are 80 distinct species around the world known as ironwood.

In Texas, for instance, it's known as mesquite. The ironwood found in the northern U.S., Canada, and Europe is actually hophornbeam. Florida has horsetail casuarina as its ironwood. In Australia, it's Queensland red ironwood; in Ceylon, gangsw. Brazil sorts pau ferro and quebracho. So, wherever you live, you'll never be wrong equating the toughest wood you know with iron, you just won't be technically correct.

By the way, whatever the exact scientific term for the different species, trees designated as ironwood frequently become homemade tool handles, mallets, fenceposts, levers, and definitely warming fuel.

Illustration: Jim Stevenson
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THE CUSHION CONTOUR SANDER—is a new concept in pneumatic sanding. Sanding sleeves are slip over an air bag (inflated with a hand tire pump) on an arbor to mount it between centers on a wood lathe. Drum effectively takes on profiles, curves, and bevels practically eliminating flat spots and chatter marks. INDUSTRIAL ABRASIVES CO. $1.00 (refunded with first order). Circle No. 1976.

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CLOCKS

KLOCKIT'S FREE 94-PAGE COLOR CATALOG—is packed with the largest selection of stylish wood clock kits for all skill levels, a huge selection of quartz and mechanical clock movements, dials and accessories, turned wood parts, music movements, tools and much more for the craftsman! KLOCKIT. Free. Circle No. 2235.
RECYCLED REDWOOD

Smith and Hawken, a retailer of garden tools and equipment headquartered in Mill Valley, California, has developed a sensitivity to their customers’ environmental concern. Their catalog portrays a garden potting bench constructed of “unfinished redwood reclaimed from old barns and warehouses.”

In 1990, the same company researched a sustainable source of teak for its line of garden furniture. Java, devoted to teak plantations, got the nod.

FARMS TURN GOLDEN

Seventy thousand American Tree Farm System members celebrate 50 years of growth this year. The system began in Washington state in 1941 with Weyerhaeuser Company property the size of Philadelphia.

Tree farms come in all sizes, with both industrial and private ownership, but collectively they represent 95 million acres growing 95 billion trees, says the parent American Forest Council.

To plant that many trees, you need to set one tree per second, 24 hours a day, 365 days a year, for more than 3,012 years!

BABY BOOMERS GROWING UP

According to the National Forest Products Association, about 23 percent of all softwood harvested in the U.S. comes from plantations established since the 1940s.

SAWS THAT SHOULD KNOW WHEN TO SAY WHEN

Lumber-mill workers in the Pacific Northwest sometimes refer to a circular wobble blade, used for sawing dadoes and grooves, as a drunken saw because of its unsteady travel.

FRONT AND CENTER: WOOD READERS WHO MAKE A DIFFERENCE

Name: Neal and Lorraine Asten
Ages: 67 and 65
Home: Henderson, Nevada
Occupation: Retired
WOOD® connection: Subscriber since 1989

When Neal took early retirement from his job at a chemical plant in 1977, he hardly knew a lick about woodworking. He did have a workshop, though, and tools enough that he had accumulated to make an occasional garden ornament, birdhouse, or whirligig.

A few days after Christmas that year, Neal, exasperated by his decline into television watching, told Lorraine, “We’ve got to find a better way to spend our time.” Making toys for needy kids came to mind almost immediately.

By the following Christmas, the pair had made nearly 1,800 toys to give away. “We started with a couple of designs from magazines, then added our own,” Neal recalls. “And we enjoyed it so much we were spending 50 to 60 hours a week in the shop.”

Neal and Lorraine have been making toys for 13 years now, without letup. Their toys reach deserving children through friends and Las Vegas-area agencies, and wind up in Canadian hospitals, in Mexican orphanages, and in the hands of kids as far away as Palestine.

“I helped a newly retired fellow in Florida get going making toys, too,” says Neal. “I like to see people get into this.”

The Astens say their biggest problem is time, since they spend three days a week selling some of their shop-made items at a local craft shop, and the other four days woodworking.

“There’re just not enough hours in the day and days in the month for us,” complains Neal. “We have 6,000 to 8,000 parts to cut out this year.”

Do you know a subscriber who makes a difference? Send details to: Front and Center, WOOD magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

Photograph: John Dize  Illustrations: Jim Stevenson
Make an Heirloom Toy for Holiday Joy

Fill a child's world with delight this holiday season by giving a handmade toy from your workshop. Better yet, build a sackful to please every boy and girl on your list. You can do it with the help of our new book "Favorite Toys You Can Make". Included are 26 timeless designs, ranging from easy-to-make playthings to more challenging projects.

This all new, hard-cover, 96-page publication (which includes full-color photos of every project), presents toys for a variety of ages and in a range of sizes. Best of all, these toys are heirlooms in the making. While any child could ride happily into the sunset on the ever-popular Rocking Horse, for instance, its rugged construction makes it sturdy enough to withstand a band of buckeroos.

"Favorite Toys You Can Make" walks you through every project with a materials list, easy-to-understand instructions, detailed drawings and handy tips from the WOOD Magazine shop. Order your copy now to ensure plenty of shop time before the holiday rush.

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Please send me "Favorite Toys You Can Make" for just $14.95 U.S. ($16.95 Canadian). Price includes postage and handling.

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